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DISEASES *of the* NERVOUS SYSTEM

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DISEASES *of the* Nervous System

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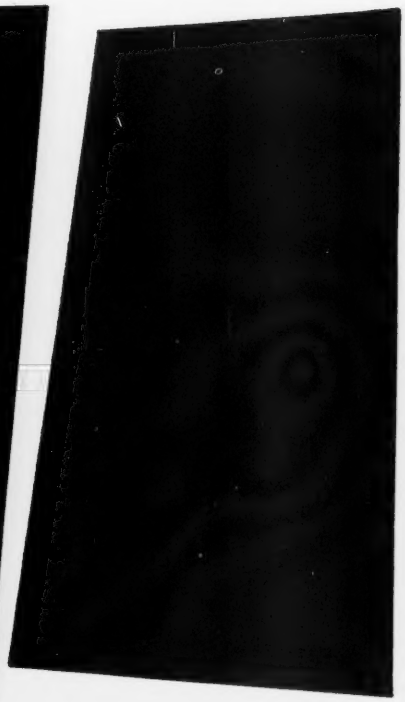

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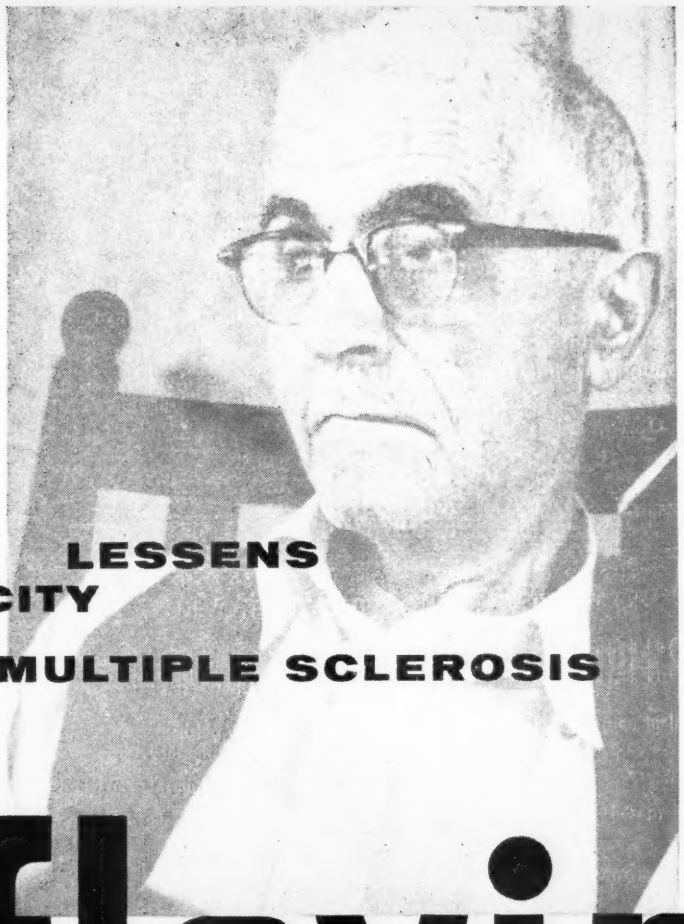

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(1) Settel, E.: FLEXIN in Geriatric Skeletal Muscle Spasm, Am. Pract. & Digest Treat., in press. (2) Rodriguez-Gomez, M.; Valdes-Rodriguez, A., and Drew, A. L.: J.A.M.A. *160*:752 (Mar. 3) 1956. (3) Amols, W.: J.A.M.A. *160*:742 (Mar. 3) 1956.

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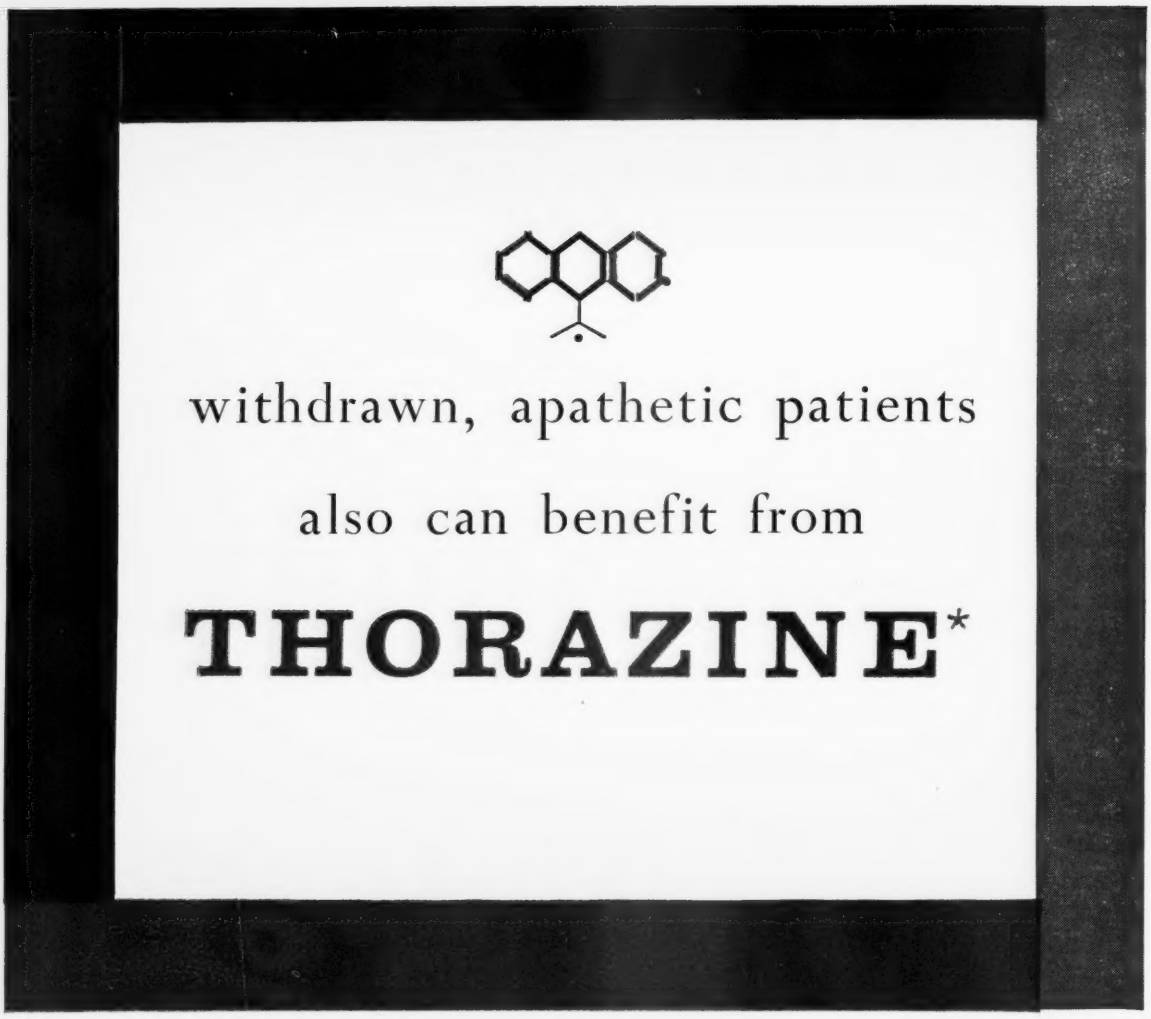

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1. Shepherd, M., and Watt, D.C.: J. Neurol., Neurosurg. & Psychiat. *19*:232 (August) 1956.

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DISEASES *of the* Nervous System

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

Neurologic Examination in Institutions for the Mentally Ill

VICTOR E. GONDA, M.D.

General Considerations:

It is common knowledge that frequently during post-mortem examinations in mental institutions we find unexpected brain pathology which was not diagnosed during the life of the patient. Among these findings are neoplasms, scars, vascular accidents—the latter mostly in the form of dural hematomas. Not infrequently these pathologic findings were the cause of abnormal behavior which was so severe that it was necessary to have the patient committed to a mental institution with the diagnosis of psychosis. Such a sommitment may at times lead to unfortunate consequences. The organic pathology might be amenable to surgical or other kind of treatment that would save the life of the patient and possibly return him to the community. Another common error is the diagnosis of an aphasic patient as suffering from major psychosis. This again might lead to undesirable consequences. The patient might lose important time during which rehabilitative speech-training would be of value. Ever since the speech therapists began to think of aphasia as a condition that involves the use of language as a whole, their results in rehabilitation are indeed much better than we ever hoped for. This is especially true in younger individuals where speech disturbance has been caused by traumatic lesion and a neurologic condition has developed which is static and not progressive. Furthermore, it is less upsetting to children to know that a parent has suffered from a neurologic lesion causing a speech disturbance than to labor under the impression that it was a mental disorder. The fact that the parent suffered from a psychosis is distressing even today when the stigma of mental disease is in process of being erased. There is always the fear that there is some inheritance of insanity. This in many instances leads to anxiety or other disturbing manifestations.

Consideration of these factors makes it imperative to have the most careful clinical neurologic examination. When this by itself does not result in a conclusive diagnosis we must resort to the available supportive and at times decisive laboratory techniques to ascertain in every "mental" case the presence or absence of organic neurologic disease. Notwithstanding the concern of some neurologists that the use of laboratory and technical help methods will "mechanize" the specialty of neurology several types of situations necessitate the exhaustive use of both clinical and laboratory procedures. One neurologic disease may be discovered the elimination of which might simultaneously eliminate the psychotic component. Such types of situations include those lesions suspected of involving "silent" areas; incipient neurologic lesions in patients with emotional disturbance, and minimal neurologic lesions in which there is a suspicion that the manifestations are purely functional.

To attain our goal of defining neurologic lesions partially obscured by psychologic components we would need many more qualified neurologists. In most countries there are no independent neurology departments in the medical schools. In many places neurology is closely connected with general medicine; in some schools neurology and psychiatry are taught by the same instructor, hence we have "neuropsychiatrists." Although the lack of independence of neurol-

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Read at the 112th annual meeting of the American Psychiatric Association, Chicago, Ill., April 30-May 4, 1956.

From the Neurological Service, Veterans Administration Hospital, Palo Alto, California.

ogy is almost universal, there are exceptions. In the last few years the United States has led in establishing facilities for intensive training in neurology for medical residents as well as for advanced research workers. One of the most important is the National Institute of Nervous Diseases and Blindness. It is hoped that we will keep up with the increasing demand for physicians who can perform adequate neurologic evaluations. The increasing number of well trained neurosurgeons is also encouraging. Even a few short years ago large medical centers had only one neurologic surgeon. Now, many small towns have one or more. There is no question that neurosurgeons expend considerable time and effort in mastering the techniques of neurologic examination and in developing skill in laboratory methods to help them in making a correct diagnosis. The clinical neurologist at times cannot perform some necessary complicated procedures and he has to have the help of the neurosurgeon. Many of these procedures are indeed minor surgical interventions.

Need for Specialization:

The great strides in neurology, enhanced by research in neurophysiology, biochemistry and enzyme studies, the development of time-consuming, highly specialized techniques, e.g., electromyography, electroencephalography, different types of roentgen examination, airstudies, angiography, etc., plus the various kinds of treatments of the mentally ill and the results of investigations to solve the manifold problems of psychiatry that have made the areas of neurology and psychiatry so vast that it is almost impossible for an average brain to absorb the entire knowledge. For this reason alone the two should remain separate, even though each is concerned with the nervous system, albeit from a different point of view. It is wise for psychiatrists to know the fundamentals of neurology, especially how to perform neurologic examination. It is certainly helpful for the neurologist to recognize mental disease.

In many mental diseases with severe abnormalities of behavior no definite changes in the structure of the nervous system or other parts of body have been found. Behavioral deviations may be caused by aging, by primary degenerations, infections, neoplasms, developmental abnormalities, etc. In the most frequently encountered mental diseases, such as schizophrenic and manic-depressive reactions, extensive work has been done without finding reliable macroscopic, microscopic, biochemic or other changes that would establish such a diagnosis. On the other hand, large parts of the brain may be destroyed without interfering clinically with mental function. It has been observed that the same pathologic findings in the brain in one individual may be accompanied by serious behavioristic disturbances and in another by none. In this regard convulsive therapy has led to one remarkable observation. Some cases having both an organic symptom complex and disturbed behavior such as agitation or depression have responded to convulsive treatment frequently by losing the disturbed behavior for a prolonged period of time. This compels one to conclude that organic lesions may exist in a causal relationship or by coincidence with the disturbed behavior.

Now that we are in an era of "tranquilizing" drugs, more and more time is being spent to find the mode and place of their action in the nervus system. A current hypothesis postulates an imbalance of inhibitory and facilitatory pathways. If this be so the balance could be influenced from opposite directions; thus different drugs might ameliorate the same crippling manifestation.

Summarizing the experience of the past thirty years with sustained sleep, fever, insulin, convulsive, surgical and other therapies of mental disease, we must admit that none of them actually enabled us to "cure" many more mental patients than those who improved by "spontaneous remissions" before these measures were used. There is no question that all the above mentioned treatments, singly or in combination, sometimes had dramatic, although only temporary, results. These treatments did result in prolonging the productive life of the patient. This suggests that some pathologic process was improved in a manner as yet unknown. Therefore, the continuing search for completely or partially removable pathology which might be the cause of mental derange-

ment or other suffering is of prime importance.

Experiences in the Neurologic Examination of Psychotic Patients

The neurologic examination of mental patients is not always an easy task. However, with perseverance, in almost all cases it was possible to gain the confidence of the patient to a sufficient degree to perform satisfactory neurologic examination. From many years of observation of incorrect techniques of novices and even of experienced neurologists we may state that many important findings were overlooked. Naturally such oversight may lead to incorrect diagnoses. For whatever assistance it might provide we should like to present some results of our experiences during the last five years while training psychiatric resident physicians perform neurologic examinations and arrive at correct diagnoses. This experience took place at the Veterans Administration Hospital in Palo Alto, California, an institution for mentally ill veterans with an average daily population of 1330, many of whom are of advanced age and suffer from neurologic complications. In addition, other patients are referred for neurologic evaluation and there is a follow-up clinic for patients afflicted with convulsive disorders. The observation of these groups of patients—the results being verified on many during surgery or post-mortem examination—give us a solid basis for the statements we offer and for the recommendations we propose. The main objective of course is to reach an early correct diagnosis as a basis for effective treatment.

With mental patients difficulties are encountered during the sensory examination. It is therefore advisable to do this examination when the patient is not tired. The variability in response to sensory stimuli necessitates repeated observations. Only in this way can we obtain reliable data. Many times it was found to be advantageous to perform the sensory examination in the morning before the patient had left his bed. In addition the mentally ill frequently have difficulty in sustained concentration; therefore, it is advisable to have a rest period during the examination. It is remarkable, too, how an explanation given with gentle patience, even for patients who are seemingly out of contact, will lead to better cooperation.

During the examination of the cranial nerves difficulties are encountered especially in the examination of the pupils and the jaw reflex. Many mental patients shut their eyelids tightly whenever a test-light is used on their pupils no matter how carefully this is done. Examination of the visual fields even in mildly deteriorated patients is almost impossible; they tend to look at the target or downwards most of the time. This tendency renders the evaluation of nystagmus a difficult and sometimes hopeless task. We have observed on several occasions that in examining the corneal reflex even experienced neurologists may touch only the conjunctiva and when the patient failed to close his eyelids recorded the corneal reflex as being absent. This procedure is inadequate as there is sparse distribution of sensory end organs in the conjunctiva. The profusely innervated cornea, on the other hand, has to be touched carefully from the side with an elongated wisp of cotton, taking care to remain out of the line of vision. During this manipulation the eyelashes must not be touched either because this results in blinking and, in turn, an incorrect interpretation of the corneal reflex.

In examining the jaw reflex, sometimes it cannot be obtained when the patient is sitting but it may be elicited when he is in the recumbent position. The presence of removable dentures sometimes results in clenching the jaws. It is therefore a good policy to take out such dentures while examining for the jaw reflex.

In general it was found helpful to utilize different positions of the patient in testing the reflexes. In particular it was observed that ankle clonus could sometimes be elicited when the patient was supine, after the examiner was unable to elicit this response in a sitting position and vice versa.

In cases of facial palsy when the differential diagnosis between central and peripheral neuron involvement was difficult due to lack of cooperation we succeeded at times in evoking emotional facial movements by simply asking the patient when he last laughed; most patients responded with a smile and thus resolved the problem.

During the course of our observations we became convinced that unusual undulating movements of the protruded tongue which differ from fibrillation, fasciculation and from parkinsonian tongue tremor and which when accompanied by "knocking" of the outstretched fingers invariably indicated chronic alcoholism. Without entering the big problem of alcoholism itself we must remain aware that many alcoholics fall and injure themselves. Most of the time they are unaware of their injuries. Later, however, when they complain of pain, physicians are apt to discount their complaints. The most frequent serious complications of such an injury may be manifested by convulsive seizures. These might be the result of contusion of the brain or the presence of dural hematoma, the latter needing surgical evacuation. Other patients may complain of "numbness" or pain in the arm or hand and, lacking any visible signs, herniated intervertebral discs in the cervical spine may be overlooked.

In examining deep reflexes it was frequently observed that seemingly absent deep reflexes were easily obtained when the patint was put in the supine position. But even in this position we found it wise not to declare a reflex to be absent until careful and repeated reinforcement had been tried. It is well in the case of an "absent" ankle reflex to use the recommendation of Babinski, namely to have the patient kneel on a semisolid chair. When this technic is used we must be aware that a hard surface would cause contraction of the calf muscles and prevent the reflex from appearing. On the other hand a sagging upholstered chair would also interfere with the evaluation of this reflex. Even in kneeling position we have to resort to reinforcement whenever the reflex is not elicited and only when all these manipulations fail to elicit a reflex response should we state that it is absent. Finally let us record a heretofore unmentioned experience of mine that, even when all these methods had failed, at times I could elicit the ankle reflex by having the patient stand on one leg and kneel on a chair with the other using a sudden stroke to the achilles tendon. These and the other observations and recommendations are equally valid when examining patients not suffering from mental illness.

Our experience suggests the following technique as being the best for eliciting the triceps reflex: Abduction of the patient's arm to ninety degrees; then flexion of the forearm so that the fingers point toward the floor; next support of the arm from below with the palm of the examiner. In this position a quick stroke is applied to the tendon of the triceps muscle just above the olecranon, being careful not to hit the muscle itself—thus avoiding myotatic contraction and consequent error. The hammer should be of a heavy type and should be used by rapidly flexing the wrist. This supplies the desirable quick impact which cannot be delivered effectually when the hammer is used by flexing the shoulder or even the elbow joint.

Among the signs of the upper extremity which test involvement of supranuclear neurons the Hoffmann reflex and its modification by Troemner when correctly executed are becoming more important as diagnostic tools. When spasticity is marked, we simply flex the distal phalanx of the middle finger and release it. If this manipulation results in flexing the thumb the Hoffmann reflex is present. But in cases of flaccidity this usual technique may be misleading because in the majority of cases it does not elicit flexion of the thumb. In such instances the following procedure may be helpful: Dorsiflex the hand of the patient and grasp the lateral and medial aspects of the middle phalanx of the middle finger. Next with the free thumb and index finger grasp the distal phalanx of the patient's middle finger, flex and suddenly release it. Frequently it is only in this way that we can obtain the Hoffmann reflex. In some instances, too, the reflex can be elicited by using this technique on the other fingers; least frequently from the little finger. If this technique does not elicit the reflex we try the Troemner modification which consists in holding the middle finger in the above described manner, but instead of bending the distal phalanx we tap the palmar surface with a flicking movement of the examiner's finger. It is remarkable how often we are thus able to obtain the reflex. If these techniques lead to flexion of

the thumb on one hand only, or if it is more pronounced unilaterally, involvement of the supranuclear neurons above the fifth cervical segment is indicated. A bilateral Hoffmann sign may simply be a manifestation of "generalized nervous tension" but it may also be a sign of bilateral central neuron involvement, as in amyotrophic lateral sclerosis and in multiple sclerosis. It is true that in most such instances, associated with the Hoffmann sign, the deep reflexes of the upper extremity are also increased. But this is not always the case, and since the evaluation of deep reflexes tends to be more subjective, we must rely upon the more objective Hoffmann sign. In cases of reversible involvement of the central nervous system the diminution and even disappearance of this sign have been observed. Another observation is worth noting although difficult to explain, i.e. that repeated examinations of the patient during the same day and by the same careful techniques may show a reflex to be present at one time and absent at another.

In the examination of the lower extremity, the Babinski sign is important both from methods of elicitation and interpretation. Several hundred publications had been written about the Babinski sign and its elicitation from other parts of the foot than the sole. Since many mistakes in the elicitation of this reflex continue to be made I would like to repeat my plea of more than a decade ago, namely to establish at least a relatively standard reflex elicitation technique. Thus we would reach a better understanding. This becomes increasingly important now that the pathologic basis for this reflex is being challenged. Until recently it was not doubted that the dorsiflexion of the big toe is a sign of involvement of the cortico-spinal system. Nathan and Smith,[1] however, question this concept after carefully analyzing 38 cases of anterolateral cordotomy. They state: "There is no particular relation between the anatomical state of the cortico-spinal tracts and the form of plantar response." And further: "The Babinski response is a pathological response; it may be taken as an indicator that there is an abnormality of function in the central nervous system." These conclusions are based upon observation of cases involving only the spinal cord. It is well known that in cases involving not only the cortico-spinal motor tract, but other tracts also, the phenomenon of the upgoing toe is frequently absent. This happens often in traumatic lesions as well as in cases of "primary" degeneration of two or more tracts. The conclusion of these authors that there is no specific relation between the form of plantar response and anatomic state of the cortico-spinal tract deserve further study in the light of the known facts about multiple tract involvement that may alter the usual manifestation when the cortico-spinal tract alone is involved. Besides they did not take into account the involvement of the cortico-spinal tract above the decussation.

Among the signs that indicate involvement of the cortico-spinal tract is the Rossolimo reflex. This is a valid test that may be frequently neglected. Its value becomes evident in even very small vascular accidents to the brain where it may be the only reflex showing involvement of the motor tract. In multiple sclerosis it is far more frequently present than are the other pathologic toe signs. Many times it precedes the others. In some instances, however, it develops later. Our observations suggest that it has a different reflex arc. The use of this test for the early detection of multiple sclerosis is indicated particularly in the presence of mental manifestations, e.g., personality changes including happy unconcern, which may precede by years the characteristic neurologic signs. With meticulous examination we may detect the following slight but important neurologic changes: Easy fatigability and even absence of the abdominal reflexes or a slightly developed Rossolimo sign. These facts may become of great importance in the future when effectual treatment for this crippling disease is discovered. Then, as in the treatment of other diseases, we might be more successful in early phases of the disease. In regard to mental disturbances in multiple sclerotic patients with the above manifestations relatively few do develop such serious mental behavior that they have to be institutionalized. On careful scrutiny we have found that, in addition to the characteristic mental picture of patients with multiple sclerosis,

there may be an additional occurrence of schizophrenic reaction.

As in multiple sclerosis, so also in cases of Huntington's chorea mental symptoms may precede the neurologic ones. Initial stages may remain static for years. In its fully developed form this heredofamilial and relentlessly progressive illness is not benefited by any presently available treatment. Disregarding the gloomy prognosis, some observations are worth noting. For the past two years we have had under observation and treatment five cases of Huntington's chorea. None of these patients had reacted to the usual sedatives. Attempting to provide some relief from constant involuntary movements we resorted to reserpine. All five reacted uniformly with extreme sleepiness to a much greater degree than other patients receiving this drug. We adjusted the dose to a minimum 1 mg. twice daily which no longer caused drowsiness. This dosage neither improved the bizarre gait, the explosive-ataxic speech nor the mental condition. But the five were benefited markedly to the extent that the choreic movement of their hands was reduced to a minimum and they were enabled to care for themselves much better, and the little remaining involuntary movement of the fingers was no longer choreic but rather of a mild athetoid nature. Two patients are still paying for this improvement with parkinsonian rigidity of their extremities. One of these patients prior to taking reserpine had a localized tic of the left eyelids which stopped completely for more than a year. It is reasonable to suppose that in cases of Huntington's chorea the already impaired extrapyramidal motor system is more sensitive to the drug. Incidentally, the occurrence of a typical parkinsonian symptom complex in some patients is of little immediate concern, because by stopping the medication or even just giving smaller amounts, the symptoms recede. Our main concern is for the possibility of late effects, perhaps years hence, resembling those late crippling effects which develop as aftermath of the different encephalitides.

It would require much space to analyze the relationship between mental disturbances and convulsive disorders. Suffice it to say that we shall deal with only one group of patients who have at various times been diagnosed as "personality disorder," "hysteria" or "unclassifiable mental derangement." These kinds of mental manifestations may precede, accompany or follow clinically observable psychomotor epilepsy. It is a not uncommon, but rather unfortunate, that some patients suffering from psychomotor epilepsy without the slightest mental complication develop severe mental manifestations when anticonvulsant medication stops the convulsion. Inasmuch as temper tantrums or behavior disorders even in young children may precede the development of psychomotor epilepsy, often this relationship may be detected only with careful and sometimes repeated electroencephalographic studies. Psychomotor seizures are frequently very bizarre and do not resemble grand mal seizures. The former are sometimes preceded by a visceral aura and less frequently by gustatory, olfactory or auditory auras. Because the unpredictable seizures do not resemble typical epileptic spells and the rebellious behavior of the patient appears willful, these persons often are the butt of derogatory remarks of other patients and even of the hospital personnel. They are frequently punished by civilian and military authorities before the true nature of their disease is diagnosed, because of their assaultive behavior which often is seemingly premeditated. Not until the studies by E. L. Gibbs, F. A. Gibbs and B. Fuster[2] identified the location of the focus of psychomotor epilepsy in the anterior areas of the temporal lobe and showed that the electroencephalographic changes can better and sometimes exclusively be observed in sleep, did we recognize that this hitherto obscure condition was a disease entity.

Bailey[3] removed surgically the anterior part of the temporal lobe in those cases which failed to respond to the known anticonvulsant drugs. When this trial promised success, other neurosurgeons all over the world followed suit, modifying some details of the original technique. The results of such efforts have been more and more encouraging, to the extent that we are optimistic about the salvage of a great percentage of the psychomotor epileptics. Judicious post-surgical care with both medication and

psychotherapy assist in the reduction of convulsions as well as in the improvement of their mental condition.

We do not recommend surgery where psychomotor seizures can be controlled by medication. This is the consensus of opinions of physicians dealing with this problem. On the other hand, I think that in many cases we wait too long before resorting to surgery. Often during surgery unsuspected tumors in the temporal lobes are found which, if not removed, would kill the patient. Because of this possibility and because it seems to be a valid observation that medication does not usually help epileptics suffering from convulsions of any type for a long time, I propose that we do not wait too long before undertaking surgery. The findings of unsuspected neoplasms and other pathology was noted by Bailey in his first series. Later, Guillaume, Mazars and Mazars[1] similarly found eight tumors in 83 patients notwithstanding normal ventriculograms. The findings of other authors confirm this. These facts, in addition to my own experiences, encourage me to reiterate my proposition, i.e., that in patients with psychomotor epilepsy not helped by medication and in whom the clinical observations and electroencephalographic studies point to definite involvement of the temporal lobes surgery must not be delayed.

The neurophysiology, surgical technique, and other considerations involved are deserving of further elucidation. Many surgeons performing this operation advise waiting at least five years before evaluating the benefits derived from removing parts of the temporal lobe. In some patients this period and more has passed and follow-ups prove that most of the cases benefited. The complex problem in these patients requires the attention of neurosurgeons acquainted with all details of the technique and a surgical set-up equipped with an electroencephalographic instrument to enable eventual identification of those parts of the brain requiring removal. Those who have had opportunity to thoroughly study this problem believe that in most cases, that do not respond to surgery, another part of the brain and not the organ of the seizure had been removed. It is also stated that whenever correctly executed surgery does not help the patient the pathology is most likely located deeper, e.g. in the centrencephalic area.

Incidental effects of the operation are transient diplopia, slight ptosis and mild aphasia. After surgery of the "dominant" temporal lobe there may be some impairment in ability to learn new words. The Kluever-Bucy syndrome[5] of hypersexual behavior shown by monkeys after bilateral temporal lobectomy is seldom observed in human. The operative risks and reported mortality are minimal but without surgery those cases that do not respond to medicinal treatment become gravely disabled. Therefore, we cannot emphasize too strongly that all our efforts should be concentrated on selecting the right patients at an optimal time.

It is with satisfaction that I mention the forward-looking orientation of the Veterans Administration which has established a center where they have accumulated all the necessary clinical and surgical knowledge as well as the armamentarium for helping patients suffering from psychomotor epilepsy. Just as after the end of World War II the Veterans Administration paved the way for the rehabilitation of neurologically handicapped veterans, we hope that here too the same team work will bear fruit on behalf of those afflicted with psychomotor epilepsy.

Observing institutionalized patients with all types of convulsive disorders it is natural to expect that they will also suffer from varying degrees and kinds of behavior disorder. The parents of these patients tend to be too tolerant and to keep them at home. However, antagonistic behavior, paroxysmal depressive reactions and assaultiveness finally compel the parents to institutionalize the patient. Gibbs, Gibbs and Fuster[2] expressed the idea that "it seems reasonable to attribute much of what has been termed epileptic personality to disturbances in the anterior temporal area." This is one more reason for using all available techniques of examination to define pathologic changes in the central nervous system of institutionalized patients.

Another approach is now suggested. The investigations of Fisher and Gonda[6] in the detection of brain pathology with neurologic

techniques as compared with the Rorschach test are encouraging. From their study they concluded that: "The findings show that as an isolated procedure the Rorschach is superior to the best of the individual neurologic techniques in detecting the presence of brain disease, and therefore warrants inclusion among the diagnostic consultative procedure of the clinical neurologist." This recommendation is praiseworthy in view of the known facts and our groping for early diagnoses. The psychiatrist, the neurologist, the psychologist and the neurosurgeon can work as a team to reach the physician's highest goal, namely to alleviate human suffering.

Summary

With relative frequency we find unexpected pathology of the brain during postmortem examinations which was not diagnosed previously. This leads to the recommendation that greater care be exercised in the evaluation of institutionalized patients. Organic pathology detected may be of a kind that is amenable to surgical or other kinds of treatment. This could save or prolong and brighten the life of the patients. Therefore, it is important to perform as complete a neurologic examination as possible and, if necessary, to utilize all available laboratory procedures in the hospitalized patient. Early elimination of the neurologic disease may simultaneously improve or eliminate the mental component.

In the neurologic examination of the mentally ill various difficulties are encountered. Methods of overcoming these difficulties are suggested. Common mistakes in neurologic examination are described; detailed suggestions and experiences on how to correct them are offered.

With reserpine encouraging results were obtained, improving at least one of the heretofore stubborn symptoms of Huntington's chorea.

Rationale and indications for earlier surgical intervention in cases of psychomotor epilepsy are described.

Closer cooperation between the psychiatrist, neurologist, psychologist nad neurosurgeon is recommended.

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The Team Approach in Group Psychotherapy

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Until recently it was felt that psychotherapy was not applicable to psychotic patients. This belief no longer prevails to the same degree and group psychotherapy has greatly contributed to enlarging the purview of psychotherapy in general. There is still, however, a tacit assumption that its ministrations are applicable only to those whose psychoses are of recent onset and to patients who are optimally intact emotionally and intellectually. To the contrary, our experience indicates that a suitable group approach under favorable conditions can affect patients positively in nearly all states of regression.

Method of Group Psychotherapy Employed

Chronic schizpohrenic patients usually participate little if at all in spontaneous group interaction. The better preserved and more vocal patients are apt to use the first few meetings as "gripe sessions" to vociferously verbalize their hostility toward the institution and its personnel. This reaction, however, is favorable to the outcome of the therapy, for when the "gripes" have been adequately answered and exhausted, circumstances are conducive to the appearance of rapport and transference. The very fact that these individuals can verbalize hostility makes them more amenable to psychotherapy.

This condition of little spontaneity or little group interaction prevailed in a group of lobotomized patients.[1] Not only was it difficult to obtain utilizable reactions from them but their actual behavior was initially very destructive of the group process: they were either quarreling with each other, making loud, incoherent, random declamations, or breaking out into peals of autistic laughter which set the entire group laughing in resonance. When quiet, such repressed individuals might sit for hours wrapt in an introvertive haze without producing a sound. Attempts to stimulate or provoke spontaneous discussions succeeded only in arousing some patients enough to make statements about the kind of food they liked or the type of clothes they preferred; it seemed that little which was fruitful therapeutically could be elicited. The mere group interaction, no doubt, was of some value, and theoretically if the permissive atmosphere of a gradually warming group climate were carried out to infinity, we might hope to attain a highly spontaneous and fruitful group atmosphere. It is even conceivable that another therapist with other skills might succeed in stimulating genuine and intensive therapeutic spontaneous interaction. However, in the long run it seems pointless to writhe and castigate oneself in a veritable agony of intellectual labors in order to devise a means of evoking spontaneous utterances from these subjects. This will have as its greatest merit the fact that it avoids preconceived stimulus material.

The comparison of "free association" with the method of "directed associations" has been explored elsewhere.[2] The essential technique of the method employed involves the intermediation of prepared stimulus material in the form of a mimeographed book, entitled "Social Adjustment."[3,4] During the session passages are read aloud by various members of the group and any member may associate to or comment upon the material covered. The therapist, likewise, may make a comment, interpretation, give additional or collateral examples, further illuminate, or expound on the subject matter. Digressions are encouraged and maintained as long as they have relevancy to the aims and purposes of group psychotherapy. Generally patients' observations and discussions take priority, and the amount of textbook material covered in any session is not important. A session is considered worthwhile if only one short phrase has been read which has led to copious comments and abundant associations and interactions.

The material of the textbook as knowledge, education or reeducation may not be the important desideratum. Neither is it

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unimportant, as Powell has pointed out.[5] By a process which we might call "affective osmosis" more of the essence of the material is incorporated by the group members than one might believe at first glance.

The Group

Attendance at the group sessions varies. It usually consists of ten or eleven chronic schizophrenics who have been in the institution for varying periods of time, from several months to several years. The group has consisted entirely of women, not out of design, but because the exigencies of intramural practice have compelled the selection of patients mostly from one ward. Consequently it has been impossible to practice some of the well established criteria for patient grouping. The reasons involved are a tantalizing paradox of psychotherapy in mental institutions. Theoretically the large mental hospital presents conditions potentially ideal for group psychotherapy. In reality these conditions are seldom realized as these institutions have not yet retooled in preparation for the new model. Many other circumstances militate against a logical systematic approach: for example, it is still necessary for an employee to escort patients to the group therapy room, and due to the shortage of personnel frequently an employee cannot be spared. Consequently candidates for the group therapy are selected on a catch-as-catch-can basis, obviously not well selected.

Nevertheless, an attempt was made to contrive a system of therapeutic progression. A more advanced, sophomore class was added as an incentive. A patient would be invited to participate in the smaller group after she had attended a number of sessions in the large group and during which meetings she had been more vocal and had made progress. The smaller group, which met in the therapist's office usually consisted of five or six patients. Therapy in this more intimate group was not meditated through a book, but was more or less psychoanalytically oriented.

The Social Worker

The institution's major goal is to increase its discharge rate. The social worker was assigned to the psychotherapy group largely to expedite discharges. In addition she also serves as the recorder of the group activities. She seldom makes any comments during the group meetings. In spite of her passive role the group came to accept her fully as a part of the group formation and the therapist occasionally appealed to her for some verification or disproof. She has been accepted, apparently, as a parent-surrogate—the mother figure. This becomes evident immediately after the sessions are over when several patients swarm around her to make their various requests. They consult her about sundry family problems, about job hunting or even about storage arrangements of household goods, etc. She has come to play the role of an intermediary between their hospital existences and their extramural careers. This adds a subtle dimension to the psychotherapy in that the treatment tends to be supplemented with action. This is especially significant when patients start rebuilding their community contacts. The worker smooths the way for the patient's discharge from the institution and is instrumental in effecting family care placements or in actively assisting patients in finding job placements on the outside. These, to be sure, are the generic functions of social service; nevertheless, social work as generally performed in a large institution does not convey the same kind of genuine, personal concern which is inherent in the proceedings and interactions of group therapy. The social worker, developing counter-transference relationships with the individual members, is apt to impart to her ministrations a genuineness that inspires trust and confidence. This is very different from the suspicion and antipathy with which many patients regard hospital personnel. Under these more favorable circumstances the worker becomes the patient's confidante. She is the "feeler" who makes tentative explorations into the outside world for them and helps greatly to reduce their sense of helplessness within the institution.

Effects of the Social Worker on Group Atmosphere

One of the most outstanding effects of the worker's participation in the group is the revivifying and enhancement of the group members' optimism. To a large extent the

schizophrenic suffers from a deep discouragement with resulting apathy and indifference. It is well recognized that one of the general over-all effects of the group interaction and one of the goals of group therapy is to decrease this pervasive discouragement. The presence and close cooperation of the social worker, her ready accessibility and her constant activity on the members' behalf tends to close the gap between objective reality and the patients' recoil from it. In implementing the various services, such as getting a job, family care placement, a dental appointment, or a pair of glasses through writing to a relative, she demonstrates actively an environmental manipulation of reality for the benefit of the individual—thus helping to objectify some of the goals of group psychotherapy.

Perhaps due to our scientific training we have come to think more or less exclusively in terms of specific actions and reactions. In psychotherapy, to the contrary, what might be called a kind of "field theory" of interaction seems to be in evidence. The careful observer cannot fail to be impressed with the general pervasive results of a therapeutic atmosphere out of which recoveries and improvements may precipitate. Since the social worker helps to objectify so much of the goals of the group therapy, she helps to strengthen the residual reality-testing capacities of the patients. Furthermore, she directly encourages mobilizations of their ego strengths.

Case Reports

Case 1. M.C. was a 37-year-old American born matron of Hungarian parentage who was admitted to the State hospital several months after her husband's commitment. He had only made a marginal adjustment for several years prior to his admission, and the hospital medical staff had diagnosed his condition as chronic schizophrenia. The patient was classified as a more acute schizophrenic. At the time of her commitment, the Court placed their three boys, 14, 8 and 4 years of age, with a Lutheran child placement agency.

A number of months after admission she was interviewed by her ward doctor in a routine 6-month check-up. She was markedly obese, and her face, unusually hirsute, bedraggled, and withdrawn, reflected an air of utter hopelessness. What struck the doctor was her apparent helplessness and hopelessness. Her own family was unable or unwilling to do anything for her and her husband, a patient of the same institution, was currently "on escape." Although his whereabouts were unknown to her, he was actually so regressed and dilapidated that he was more of a liability than an asset to her. During her interview with the ward doctor she revealed considerable residual emotional and intellectual capacity and he invited her to attend group psychotherapy sessions.

After attending the first few group meetings she brightened up remarkably and her entire attitude and appearance changed drastically. Her interests revived to such an extent that she resumed writing poetry, which had been one of her previous avocations. The social worker contacted her family regarding discharge planning but they could offer no help whatsoever. Her one asset in terms of work potential was her former training and working experience as a practical nurse; however, she had not done this type of work for over ten years. She formed a warm, positive relationship with the social worker through their mutual planning for her discharge. She was finally accepted for placement on a self-support family care arrangement in a Lutheran old people's home.

During the ensuing several months the patient had difficulty adjusting to her new surroundings. She objected to the strictures placed on her freedom and became overtly hostile toward the superintendent of the home, a clergyman, because through agreement with the worker, he allowed the patient only $10 per week spending money, and the remainder was placed in her savings account. The minister was tolerant of the patient largely because the social worker who consulted with him periodically and interpreted the patient's behavior to him. Likewise the patient profited by the worker's interpretation to her of her position and status in the home.

At present the patient's work in the home is considered satisfactory. She has made friends among her fellow employees and seems to be reasonably contented. She has continued to attend the group psychotherapy sessions at the hospital weekly, on her day off and makes this trip regularly in spite of the fact that the trip necessitates taking a taxi, a train and a city bus.

After discharge from the hospital she located her husband and was somewhat instrumental in his return to the institution. She visits with him after the class sessions. She is able to accept the fact that he will probably never be of much help to her. In the group sessions she readily recognizes and verbalizes some of the dynamics of her own breakdown, e.g. her mother's early rejection because she, the oldest of six, was a girl. She talks freely of her relationship to her husband with its negatives and positives and some of her unsolved problems in her future relationships with her children. The whole family situation, initially so hopeless, today shows marked signs of improvement. She visits her children frequently, writes them regularly and is voluntarily contributing toward their support. She is very pleased with her oldest son's recent decision to enter the ministry and this boy has already enrolled in a religious academy.

In a large mental hospital where patients are treated and cared for en masse, patient relationship to doctor and social worker is often distant. Furthermore the social worker is dependent upon the patient's ward doctor for all planning for the patient, with whom he may be only superficially acquainted. The social worker, guided by regulation generally performs her services in a routine, mechanistic way. However, when she has become a part of a group therapy team she acquires direct knowledge of the patient that no amount of hospital records could give her. She gains an intimate knowledge of the patient through actual contacts, gains further through the incidental comments of the therapist and considerably more through her frequent conferences with him. Because of this she is able to act with conviction and enthusiasm and understandably is better able to interpret the patient's condition to prospective employers or guardians. These qualities often may swing the balance favorably with a prospective employer, who otherwise hesitates to accept a patient from a mental institution. The patient, too, gains through the positive relationship with the worker at a time when otherwise patient is very much alone. Thus the social worker as a subsidiary therapist, offers the patient sufficient support during the initial period of the extramural adjustment to tide her over until she can satisfactorily accommodate herself to her working situation and develop relationships in the community.

Case 2. R. D. is a 41-year-old divorced white woman, mother of one growing boy, was admitted to the hospital as a voluntary patient on 6-2-1954 and classified as schizophrenic reaction, chronic undifferentiated type. A month prior to admission she had been discharged from her job as a child's nurse. She then conceived the idea that people were watching her and feared leaving the house. Shortly after admission she underwent gynecological surgery, had shock therapy and later received Serpasil medication.

The therapist first encountered the patient when she was transferred to his ward. She was still markedly hyperactive and overtalkative, exhibited a manic reaction and was always trying to get the doctor's attention with many useless questions. During his rounds he could not influence the patient with any discourse or answers to her questions, and began to react to her manic-like attacks with sarcastic counter-attacks. Then one day she made a sincere statement of her need and wish to receive help. The doctor at once dropped the sarcasm and invited her to join the therapy group, which invitation she accepted. Within the group her behavior and actions were initially very much that of a "monopolizer." Over a period of some weeks this behavior was interpreted to her and her reactions changed dramatically. She no longer sought the intensive positive reaction from the therapist and for the first time became conscious of group transactions. She became adept at interpreting her own and other patients' reactions.

After the second group session R. D. approached the social worker regarding discharge planning. The worker consulted the therapist who was of the opinion that she was not yet ready for discharge. R. D.'s relationship with these two professional persons was already strong enough that she could accept their recommendations despite the fact that as a voluntary patient she had the privilege of leaving. She recognized how she could help herself and talked freely to the social worker about her attempts to control her impulsive outbursts. The worker arranged for a visit to her son in his foster home placement and after talking over plans with the worker she gradually resumed many of her community-church contacts. The worker's entry in the record that "She (R.D.) discusses her future planning rationally and realistically" is in sharp contrast to the recording of another social worker made prior to her admission into the psychotherapy group: "Having signed her 15-day notice to leave the institution she was seen in the Social Service Department without an appointment and her manner was hostile."

Several of R.D.'s later plans did not materialize. She was hired as a dining room girl in a boys' school and then told at the last minute that she couldn't have the job as the person whose place she was filling decided not to leave. Her hopes to be assigned to the welfare trainee program likewise collapsed (this being an arrangement where patients are discharged from patient rolls to continue in the hospital on an employee-patient status). During this period the worker actively supported her, encouraging her to talk out her feeling of disappointment. She came to see that the other patients in the group were likewise supportive, rather than critical as she had anticipated. A suitable position was finally found for her and she left the hospital four months after joining the group psychotherapy class. To date she continues to adjust satisfactorily.

This case demonstrates how the social worker is able to offer the patient an appropriate degree of emotional support. The worker can fill in the chinks left by the therapist, who because of his other duties, is not always available. This supportive social worker-cotherapist role within the hospital is more objectively demonstrated in the following case:

Case 3. G. E., a 27-year-old, single, white woman was transferred to this hospital on 9-20-54 through authority of the State Deportation Department. She had been committed to a state mental institution in Ohio where she was diagnosed as chronic schizophrenia. Her three-month old illegitimate baby, brought to Chicago at the same time, was placed through the Family Court of Cook County. This was G. E.'s second hospitalization, as she had previously been in this hospital in 1951 with the same diagnosis. Both times her condition characterized a marked disturbance in affect, extreme withdrawal, and a slowing up of speech and thinking processes to such a degree that she seemed to be a mental defective. When she joined the group therapy sessions in early 1955 she was still meek, passive, ponderous and unresponsive. She rarely participated in any group discussions as she was far too shy and insecure to venture into any group interactions.

Her attendance at meetings gradually improved. She came to participate freely in group discussions and to welcome opportunity to talk over personal problems and to formulate and crystallize her future plans which center around a possible marriage to the putative father of her baby. The group supported her in this decision despite the fact that this man is of a different religious faith. At times she spontaneously brought up some of her dreams for discussion and enjoyed their being interpreted for her. She can now spontaneously offer criticisms of the behavior of other group members. In her general appearance she has gradually come to reflect her increased motivation and self-determination, now takes pains to look well, dresses in good taste, and has come to be one of the most attractive female patients on the grounds.

The social worker-cotherapist began discussing future plans with her. She began to see that preparation for marriage to the father of the baby meant not only preparation to leave the hospital but also to accept the responsibility for her baby and for the home she would establish. As she has no other resources, she came to realize, too, that this was a more difficult task than just "getting a job and leaving the hospital" to live by herself. She now accepts her mother's almost complete rejection.

The worker arranged for G. E. to see her baby. During the past four months she has visited the child eight or nine times and the child has come to have increasingly more meaning for her. The child comes to her spontaneously now and she assumes an active role with the baby. In her continued correspondence with the father of the infant she describes the baby with much feeling. Meanwhile she talks out her feelings freely with the social worker and together they plan how she can learn more about home economics and household management. The father of the baby returns from the Army in February 1956 and meanwhile their plans of marriage and of assuming responsibilities are taking on more reality.

Summary and Conclusions

1. Because of the team approach and the transference and counter-transference relationships formed in group therapy, the social worker co-therapist has a far more intimate acquaintance with the patient's needs and capacities and can therefore plan far more effectively for the patient.

2. The social worker, being thus advised and conditioned, can help implement an interim supportive psychotherapy between the group sessions. Her figuratively filling-in of the chinks makes the group experience more meaningful to the patient.

3. Because of the transference and counter-transference relations of patient and social worker, transition between the hospital careers of patients and their contemplated extramural placement is smoother and easier.

4. Extramurally, the worker is able to furnish a degree of supportive therapy which often is effective in helping the patient over rough spots in early extramural adjustment.

5. Intramurally group psychotherapy promotes integration of hospital treatment and rehabilitation efforts.

6. Though many of the institutional population are destined to remain permanent inmates, yet with a regimen such as suggested, others can be satisfactorily rehabilitated to make good extramural hospital adjustments.

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Treatment of Regressed Schizophrenics with Chlorpromazine, Reserpine and A Combination of Both Drugs

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Among the boldest challengers in testing the efficacy of chlorpromazine and reserpine remain the so-called back ward patients of large mental institutions. At Elgin State Hospital 348 patients were treated, all of them schizophrenics who were chronically nude, incontinent, combative, destructive and noisy. All patients had received some form of shock therapy. The project began February 24, 1955 and the present evaluation is gleaned from data available one year later, February 23, 1956.

TABLE 1

Number of patients treated	348
Number conditionally discharged	79
Returns (12.6%)	10
Patients remaining out of institution	69

TABLE 2

Average age of 348 patients treated	41.6	yrs.
Age of youngest patient	17	yrs.
Age of oldest patient	67	yrs.
Average hospitalization length of 348 patients treated	10.5	yrs.
Shortest hospitalization	1	mo.
Longest hospitalization	29.7	yrs.

As can be seen from Table 2, the average age of the patients was well within the middle age bracket and their length of hospitalization indicates definite chronicity.

TABLE 3

Distribution of medication to 348 patients:

Chlorpromazine	211
Reserpine	56
Chlorpromazine and reserpine combined in a relationship of 100 mg. chlorpromazine to 1 mg. reserpine	81
	348

The combination of chlorpromazine and reserpine in a relationship of 100: 1 had been tested before in a double blind pilot study[1] on 11 patients. Part of the goal of this study was to test it on a larger number of patients.

After one year had elapsed, 79 out of the 348 patients had been discharged. Out of these 79, ten had returned. In this connection the over-all discharge and return rate at Elgin State Hospital during previous years is of interest.

TABLE 4

Conditional discharge from and readmissions to Elgin State Hospital before introduction of ataractic drugs:

	1952	1953	1954
Total conditionally discharged	1072	1148	965
Total returned	449	396	361
	(41.88%)	(34.5%)	(37.4%)

(A conditional discharge in Illinois denotes that the patient remains under outpatient clinic supervision.)

TABLE 5

Patients discharged (69 out of 348, February, 1955 to February, 1956):

Average age	37	years
Age of youngest	17	years
Age of oldest	64	years
Average length of hospitalization	5.8	years
Shortest hospitalization	1	month
Longest hospitalization	23	years

At this writing the activities of the discharged patients group themselves as follows:

TABLE 6

Activities of discharged patients:

Gainfully employed	18
Keeping house independently	27
Keeping house under supervision	18
Idle at home	6
	69

Those gainfully employed work as comptometer operators, tailors, baby sitters, housekeepers, storeroom clerks, laborers,

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maids and orderlies. Those who keep house independently, free another member of the family of this burden, save the expense of hired help for this purpose, and enable another person to enlarge the family income.

TABLE 7

Distribution of medication among 69 patients out of institution:

Chlorpromazine	54
Reserpine	3
Chlorpromazine-reserpine combined	12

TABLE 8

Side effects observed in 69 patients away from institution:

	Chlorpromazine	*Reserpine*	*Combined*
Number	2	0	1
Time elapsed until appearance of side effects	19 days (excessive salivation) 8 days (Parkinsonism)		13 days (excessive salivation)

Once patients had left the institution, side effects were minimal and they occurred relatively early after discharge. This may be due to the fact that their dosage had been adjusted by the time of discharge.

TABLE 9

Length of time away from institution (69 patients):

7 months	6 patients
6 months	9 patients
5 months	10 patients
4 months	12 patients
3 months	12 patients
2 months	5 patients
1 month	10 patients
Less than 1 month	5 patients
	69

For the discharged patients, a special chlorpromazine-reserpine clinic was established. The indication for this became obvious during a double blind pilot study performed on highly disturbed psychotics, who were rotated through periods of chlorpromazine, reserpine, a combination of both, and placebos. Most severe relapses had been observed during the placebo interval.[1] This demonstrated that severely disturbed patients, who had responded to ataractic drugs, could not be abruptly discontinued.

By the middle of July, as patients began to leave, the clinic was opened. It was staffed by a psychiatrist, social worker, laboratory technician and pharmacist.[1,2] A preliminary announcement had been published elsewhere.[4]

It was the physician's and social worker's function to prepare the families in advance for the approaching discharge of their relative, who had been hospitalized for years, and work out realistic plans with them as to supervision and care. The importance of the administration of drugs is stressed. Relatives are apprised that the patient would not return to them "cured," but still in much need of understanding and consideration. It is made clear that clinic visits at regular two-week intervals are necessary. Side effects to be expected are described and explained before the patient leaves. The family is instructed that the patient is at liberty to look for employment, but, on the other hand, if he wishes to return to the institution, he will be accepted.

The patient likewise has been prepared emotionally for the important step of leaving the protection of the institution. He is acquainted with the necessity of taking the drug regularly and on the day of discharge he receives an adequate amount to support him until the first visit to the clinic.

During the clinic visit a careful search for side effects is made, interpersonal therapy and counseling of the family are practiced in addition to morphological blood studies and replenishing of drugs.[2]

Six patients out of 69 failed to appear at the clinic since their discharge. Their absence from the hospital ranges from 30 to 150 days. Three of them had been receiving chlorpromazine, one reserpine, and two the drugs in combined form. Attempts to locate them have been unsuccessful.

TABLE 10

Reasons for return (10 patients):

Irregular clinic attendance	2
Patient desired to return	2
Side reactions occurred, resulting in discontinuance of drug	1
Uncooperative in taking medication	1
Relapsed while on drug therapy	4
	10

Irregular clinic attendance was the fault of the relatives. The two patients who wished to return had hospitalizations of 20 and 23 years respectively. This leaves a

mere four patients out of 79 who actually relapsed while on drugs extramurally, 2 while on chlorpromazine, 2 while on the combination.

TABLE 11

Distribution of medication among 10 returned patients:

Chlorpromazine	6
Reserpine	0
Chlorpromazine-reserpine combined	4
	10

TABLE 12

Length of absence from institution of returned patients:

Chlorpromazine	*Reserpine*	*Combined*
44 days	No returns	69 days
4 days		39 days
90 days		30 days
29 days		1 day
68 days		
104 days		

Out of the 348 patients a subgroup of 234 was observed and evaluated more extensively.

TABLE 13

Cessation of nudity, incontinence, combativeness, destructiveness and noisiness, but not yet socially recovered to a degree to permit discharge	111
Socially recovered and awaiting discharge	25
Discharged out of special group of 234	28
	234

The cottage housing these 234 patients discharged a total of two patients in 1953, and one in 1952, before chlorpromazine and reserpine treatment was begun.

TABLE 14

Breakdown of medication given to 234 patients:

Chlorpromazine 107	*Reserpine* 53	*Combined* 74	
Improved—not ready for discharge			*Total*
51=47.7%	40=75.5%	20=27.0%	111
Socially recovered, awaiting discharge			
16=14.9%	2= 3.7%	7= 9.5%	25
Discharged			
21=19.6%	3= 5.7%	4= 5.5%	28
Unimproved			
19=17.8%	8=15.1%	43=58.0%	70
			234

It is evident from Table 14 that percentage-wise reserpine attained the highest rate of over-all improvement (84.9%). This includes those who improved by abandoning the symptoms mentioned above, but are not ready for discharge in our evaluation; those who have reached social recovery, but so far have not left the institution, and those who, out of this special group of 234, have left. Chlorpromazine ranks next with 82.2%, but when used in combination with reserpine a mere 42.0% in these categories were obtained; 58.0% remained unimproved while on the combination, 17.7% while on chlorpromazine, and 15.1% while on reserpine.

TABLE 15

Average length of treatment and average maximum dosage required for cessation of incontinence, combativeness, destructiveness, nudity and noisiness:

	Chlorpromazine	*Reserpine*	*Combined*
Average length of treatment	38 days	54 days	27 days
Average maximum dosage	800 mg. daily	12 mg. daily	600-6 mg. daily

A patient was considered unimproved when the above symptoms had not disappeared after 90 days.

As to the length of time necessary for symptoms such as nudity, incontinence, combativeness, destructiveness and noisiness to disappear, the combination of the two drugs acted fastest (27 days), with chlorpromazine ranking next (38 days) and reserpine last (54 days). The dosages are self-explanatory. A combination of 600 mg. chlorpromazine and 6 mg. reserpine was necessary to accomplish this relatively fast improvement, if patients did improve while taking the combination. If improvement did not occur with any of the compounds within 90 days, it could not be expected even when treatment was continued as long as five to seven months.

TABLE 16

Side effects observed on 234 patients:

	Chlorpromazine	Reserpine	Combined
Patients treated	107	53	74
Number developing side effects	8	6	30
Number of side effects observed	10	14	71
Aver. time elapsed until appearance of side effects	65 days	71 days	46 days

Table 16 indicates that in a number of instances patients developed more than one side effect. The combination shows the highest number of side effects observed and the highest number of patients involved. Chlorpromazine shows the lowest number in both respects. Side effects developed more rapidly while using the combination but slowest with reserpine. The types of side effects encountered with the three compounds are listed.

TABLE 17

TYPE OF SIDE EFFECTS:

Chlorpromazine:	
Parkinsonism	2
Facial edema	2
Lethargy	2
Dizziness	1
Drowsiness	1
General weakness	1
Staggering gait	1
	10
Reserpine:	
Stupor	3
Excessive salivation	3
Generalized rigidity	2
Parkinsonism	1
Edema of lower extremities	1
Heavy breathing	1
Rash on face and body	1
Generalized weakness	1
Generalized tremulousness	1
	14
Chlorpromazine-Reserpine Combined:	
Excessive salivation	12
Parkinsonism	11
Congestion of nasal passages	8
Heavy and labored breathing	7
Stupor of various degrees	6
Staggering and abnormal gait	6
General muscular rigidity	5
Edema of face	5
General weakness	4
General tremulousness	2
Convulsions	1
Dizziness	1
Drowsiness	1
Excessive perspiration	1
Oculogyric crisis	1
	71

TABLE 18

Reasons for delay of discharge of 25 patients:

Family refuses	8
No room or funds for patient, according to family	5
Family deliberating	4
No family	1
Patient refuses to leave	2
Awaiting permission to enter other state	2
Awaiting immediate discharge	3
	25

The reason for the delay of discharges of socially recovered patients lends itself to an interesting side study.

It had been our principle, once a patient had attained social recovery, not to transfer him to a so-called better ward. In this we were guided by several reasons. The patient might feel rejected by the very ward personnel with whom he had accomplished his improvement, were he now to be separated from them. He might be rejected by the patients and employees on the "better ward," who are apt to look down on him due to his institutional background. We felt that the family would be the most appreciative group the patient could join. Thus we have been discharging patients directly from the cottage where they once had lead a regressed existence.

Fifteen per cent of all patients began treatment with parenteral medication, later changing to oral medication as cooperation increased. This, however, holds only for those who received chlorpromazine or reserpine individually. The combination was not given in parenteral form and the patient who refused to take the combination by mouth was diverted to the chlorpromazine or reserpine groups. It can be said that the longer a patient remained on parenteral medication and the higher the dosage, the poorer was the final outcome. The remaining 85% took medication orally only.

Discussion:

In this study we treated with chlorpromazine, reserpine or in combination 348 of the most regressed schizophrenics who averaged 10 years of hospitalization and fell in the middle age group.

Continuation of drug therapy in patients who have reached social recovery and who have left the institution, seems indicated at this time. Kline[3] found that drugs should not be discontinued abruptly, and our previous study[1] bore this out. We have practiced gradual diminution of maintenance dosage in several cases but not complete with-

drawal. Besides searching for side effects, practicing interpersonal therapy and replenishing drugs, it developed that a very vital function of our chlorpromazine-reserpine clinic is the constant adjusting of dosage. Details of this and the outcome of eventual withdrawal will be reported separately. Seemingly the needs of patients vary as time goes by. A moderate increase may avoid an impending relapse, while a decrease may prevent threatening side effects. Out of ten patients who returned, four relapsed while taking the drugs (Table 10). It is these reasons which presently make complete withdrawal appear premature.

By practicing continued medication we were able to keep 69 out of 79 patients discharged. Out of these, six patients have been away from the hospital longer than seven months (Table 9). Returns occurred after absence of from one to 104 days. On the other hand, six patients failed to attend the clinic. They have not returned to the institution, have not been heard of and cannot be located.

Improvement occurred fastest with the combined use of chlorpromazine and reserpine Table 15).[1] This, however, took place at the expense of a larger number of side effects (Table 16), whereas chlorpromazine, when used alone, showed the least side reactions. Side effects appeared more rapidly in patients receiving the combination (46 days average), slowest with reserpine (71 days), with chlorpromazine ranking in the middle (65 days) (Table 16). The quality of improvement was practically identical in all three groups. The over-all improvement rates with regard to disappearance of symptomatology, readiness for discharge and actual discharge amounted to 82.2% among those patients treated with chlorpromazine, 84.9% in those treated with reserpine, but only 42.0% in those receiving the combination (Table 14). Of those who remained unimproved 17.8% were treated with chlorpromazine, 15.1% with reserpine, and 58.0% had received the combination. There remains the possibility that certain patients, who react unsatisfactorily to the drugs when given individually, may respond better to the combined form.[3] In such cases, patients need intensive observation. We found that by not allowing the blood pressure to drop below 90/60, the parkinsonian syndrome may be avoided. As a whole, the issue of combined chlorpromazine-reserpine therapy remains inconclusive.

It should be clearly understood that discharge of a patient is not identical with full clinical remission. The discharge of a patient from a mental institution is dependent upon many factors, including the policy of administrators, the cooperation of the family, and the willingness of the patient to leave. Likewise, discharge is frequently delayed or prevented by exterior factors, as outlined above (Table 18). To judge the efficacy of a drug merely by the discharge rate of a given number of patients is not a true picture.

Summary:

1. Chlorpromazine and reserpine continue to be instrumental in bringing about improvement in regressed schizophrenics and where discharge is not possible, the ward milieu improves considerably.
2. Chlorpromazine and reserpine may be used in combined form in patients who do not respond when the drugs are given individually, provided vigilance is practiced to control side effects.
3. Seventy-nine out of 348 incontinent, nude, combative, destructive and noisy patients were discharged over a period of one year. Eighteen of these are gainfully employed, 27 keep house independently, 18 under supervision, six remain idle. A mere 10 returned; out of these, four relapsed while on drugs, one relapsed due to side effects resulting in discontinuance of the drug, and five returned for reasons not directly connected with the drug therapy.
4. It is felt that continued drug therapy has been contributory in keeping 69 out of 79 once highly regressed patients, who had improved while receiving ataractic drugs, on discharge status. By now six out of these 69 patients have been away from the hospital longer than seven months on such a regimen.
5. Tranquilizing drug clinics should cater to any non-hospitalized emotionally ill person in need of such medication, thus possibly preventing a full blown mental illness. They should not be restricted to discharged mental hospital patients.

Authors' Note: This study was supported by a grant from Smith, Kline and French Laboratories, Philadelphia, Pa., who also furnished the chlorpromazine manufactured under the trade name Thorazine.

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Recent Evolution of Psychoanalysis and Psychotherapy

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Those of us who make our living in the practice of psychotherapy may find it of interest and use to reflect on recent trends in our field, on their origin and possible outcome. In psychotherapy there is presently a remarkable growth which stems from an increasing awareness on the part of doctor and patient of character sickness, and the major problem confronting psychiatry today is to devise adequate psychotherapy for this type of disorder.

Since World War II our numbers have greatly increased. The American Psychiatric Association has grown from 3600 in 1945 to 8500 in 1955. Statistics are not available to demonstrate the proportion of their time which these psychiatrists devote to the practice of psychotherapy. However, certain broad tendencies are evident. From the training interests of residents, the character of papers in publication, and the establishment of sizeable hospital and out-patient programs with specific psychotherapeutic orientation, we may assume a growing interest in psychotherapy among psychiatrists. It has been estimated that for every psychotherapeutic session conducted in Dallas in 1946, 25 to 30 are being conducted in 1956. Also in related but non-medical professions, there are significant movements toward provision of psychotherapeutic services.

In spite of this growth there remains a demand for psychotherapy which far exceeds its availability. Faddism and extravagant overselling may account for some of the demand but the main factor is sincere public education as to a widening scope of indications for psychotherapy. No longer does dynamic psychiatry focus only on specific psychoneurotic symptoms such as conversions, phobias and compulsions. Within its purview come marriage tensions and divorce; alcohol, drug and other habituations; career problems; personality patterns of inadequacy, masochism and impulse; crime and delinquency; and all manner of psychophysical disturbances.

Suffice it to say, then, that psychotherapy is in a period of great expansion related to public knowledge of the widening scope of indications for its use. The trends are reflected in our practice. If asked what I do in practice, I should have to answer that I treat some psychoneurotics, many personality disorders and borderline cases, and some psychotics. For purposes of formal diagnosis about 75 per cent fall into the middle category, which constitutes the disturbances of personality pattern and trait, and the sociopathies. My diagnoses may be biased and I have no broad-based statistics but in talks with others around the country I find them to have experiences similar to mine. In the clinic for psychotherapy at Southwestern Medical School 90 per cent of patients in treatment are diagnosed character disorder. Patients in the Veterans Administration Mental Hygiene Clinics preponder-

Read before the Galveston, Texas, Meeting of the Texas Neuropsychiatric Association, April 22, 1956.
From Southwestern Medical School, Dallas, Tex.

antly fall into the personality disorder classifications.

The increasing appearance of character disturbances in psychotherapeutic practice reflects a complex interplay between two evolutionary trends. These are, first, a fundamental change in the clinical picture of mental suffering in the last several decades, and, second, the accumulation by psychiatrists of a great amount of theoretical and some practical knowledge of ego-psychology.

In classic neurosis an integrated person is suddenly disturbed by inadequate actions or unusual impulses. In modern neurosis we deal not with a personality disturbed by an immediate event but with one malformed and so involved in the illness that there is no borderline between personality and symptom. Often the sickness is more troublesome for the environment than for the patient.

During the last several decades attitudes toward the rearing of children have changed. Trends conceptually represented as permissivism, or progressive education may truly signify the abdication of authority on the part of parents. A firm and dependable morality and a consistent life goal or sense of direction is lacking. Craftsmanship and creativity hold less value. The work-day is often viewed as a period of miserable enslavement enforced by dependent needs. There is a tendency of parents to sanction and indulge the child's primitive dependent, ambitious and sexual needs, and for the child to feel guilty: because of rejection if it refuses, and because of guilty identifications if it gratifies the parent. From time to time the discoveries of psychoanalysis, falsely regarded as idealizing instinctual behavior, have been used to rationalize such collusion. Freud sensed this trend early and warned about it in his paper in 1911 on "Wild Psychoanalysis." The trend also may be seen in the novitiate psychotherapist. Certainly psychiatrists in general, who occupy positions of more and more authority in the public mind, may expect to reckon with this cultural trend.

From the beginnings of psychoanalysis and dynamic psychiatry we can trace a growing knowledge of ego-psychology, with man's self-awareness and self-regulation in his social milieu. In 1897 Adolf Meyer spoke of the development and differentiation in the growing infant of a "conscious or sentient life, expressed especially in language." "Not all reactions," he said, "become conscious, but largely those which mean a change in the relations between the whole individual and the outside world." Eight years later Meyer voiced dissatisfaction with what he called arbitrariness on the part of Kraepelin in calling dementia praecox a disorder of metabolism, and proposed "the concept of habit-disorders as suggestive of investigation of fact, and of modifiable and accessible factors, also not necessarily dependent on heredity." Meyer put the emphasis in schizophrenia on "a deficiency of critical and consecutive thought habits, with a prevalence of interest in the fantastic, mystic, religious and unreal, owing to deficiency in working interests which would dovetail with the progressive active course of the world."

Between 1910 and 1920, European psychoanalysts—Alder, Freud and particularly Ferenczi—began to study the ways in which the organism copes with immediate reality. Ferenczi described several very early stages in the emergence of the ego. He saw the infant in these very early stages as attempting to overcome an unpleasant reality of helplessness and forced passivity by means of omnipotently magical fantasies, gestures and words. Relationships to the so-called narcissistic neuroses, the schizophrenias, were suggested. But the main interest of psychoanalysts in ego structure for some time to come was in seeing it as an effect of libidinal distribution. Later it was also regarded as a defensive apparatus protecting the individual from painful conflict. Wilhelm Reich in the late twenties wrote extensively on the defensive functions of the ego as they appeared in the service of resistances in therapeutic psychoanalysis. Through the thirties Anna Freud and many others enlarged on the defensive operations of the ego. In the last two decades Sullivan, Fromm-Reichman, Knight, Eisler and others have contributed greatly to ego psychology through their study of psychotic processes. Their view of the ego has been concerned with its function in the accom-

plishment of communication and satisfaction in interpersonal relationships.

What I have to say from this point may depart somewhat from the spirit of my title in that it represents a synthesis of current readings and personal experience in regard to this broad sector of psychotherapy. It is necessary to define what I mean by "character sickness." This is indeed a very broad field, and it makes sense to see what such syndromes have in common, how they relate to each other and cluster about a basic concept. If we follow a psychoanalytical scheme for human edevelopment, we will note that these conditions recapitulate pre-oedipal modes of thought and behavior. Concern about sexual rivalry has not been fully reached; it is often either absent or an intellectually distant subject. Also less evident, therefore, is that type of conscience which is emphatically concerned about who gets hurt in the dethronement of a parent. It would not be correct for me to say oedipal problems are completely absent in character sickness. Regressions into pre-oedipal expression may occur as a backing away from the rivalries encountered in the oedipal stage. On the other hand, there are always more or less strong elements of non-progression of ego development beyond archaic stages. The psychopathological process leans toward fixation rather than regression. It is just to the extent that these conditions represent a fixation in, rather than a regression to, archaic ego functioning that these patients have a pervasive sickness of the organism as a whole. In this approach normal reactions to stress and chronic schizophrenic fixations are regarded as polarities of a continuum along which other functional illnesses are distributed according to the presence or absence of ego-maturity.

We are able to delineate the degree of ego-immaturity or the degree of fixation at archaic levels of ego function by the appearance, in varying amounts, of several modes of interpersonal operation. First, we may note a more or less habitual tendency to reduce tension by immediate discharge actions. Another person is not considered. Frustration tends to be followed, with little or no interposition of time, by an intense emotionally driven behavior. Psychic homeostasis is maintained by a primitive process. With a mature ego one would differentiate and organize experience in planning toward satisfaction. In its primitive state, however, the ego is unburdened by the demands of reality, time, logic, or order, and it strives for immediate discharge and nothing else.

Second if frustration is tolerated at all, the person with an immature ego tends to develop states of painful high tension which are beyond his capacity to master. Somatic manifestations are likely to occur. The mature ego can tolerate anxiety, and this allows time to design appropriate and purposeful action. It is this blinding type of anxiety which accounts in ego-deficient people for unwitting and peculiar actions which are often painful to others. While these actions are hostile to those hit, for the patient they are blindly driven, relief-seeking mechanisms.

Third, in ego-immaturity one relates to other people by identification rather than objectivity. What is perceived is imitated. Identification plays a great part in ego-building. The trap of identifying with a sick parent is evident. Also, since the self and non-self are largely indistinguishable, the person with an immature ego tends to attribute his own feelings to others. If he wants to bite, he perceives others as having similar designs on him. Thus, there develops a most primitive kind of conscience which is succinctly stated as "An eye for an eye and a tooth for a tooth." The person with a mature ego, on the other hand, differentiates himself and his motives from those of the other person. His instinctual wishes and fears do not falsify reality.

Fourth, the primitive ego, as we have seen, is more or less powerless in relation to its own drives and to the demands of the outside world. By reason of his attenuated conception of others the person with an immature ego sees himself as very powerful and very lonely. We can note this clinically, whether it be in terms of the achievement-bound character, or the schizophrenic who lies under the bed masturbating and proclaiming himself as a savior of all mankind. The person with a mature ego does not set his goals so unattainably high, yet with en-

ergies stemming from such infantile drives may become in reality quite productive, patriotic or capable of sustained effort in other useful directions.

Fifth, a most significant need of the human mind arises from these early experiences with omnipotence. This is the need for attention and affection. The ego-deficient character is commonly called narcissistic, yet he is probably no more or less so than any other human being, but, because of the inadequacy of his interpersonal relationships, tends to remain in a state of colossal deprivation as far as his narcissistic needs are concerned. People fixed in primitive stages of ego-function may vehemently deny narcissistic needs. If they admit them, they may show us that they are unable to effectively position themselves with other people so as to receive them. Some attempt to gain these supplies through fantasy productions, and others, at a different level, try through aggressive or passive manipulation to maintain an outside source of narcissistic supply. Yet, because they cannot reciprocate, their friendships are evanescent, and their self-esteem is not thus durably maintained. The mature person can give and take in these matters.

It is quite obvious that a person who manifests all these psychopathologies at once in intense form is in no sense a borderline case but is an hallucinated, dissociated schizophrenic, far withdrawn from, and emotionally inappropriate, to any current reality. So I wish to emphasize that in talking about character sickness I do not imply a black or white picture, but something in between schizophrenia and a normal, or even neurotic, reaction to stress.

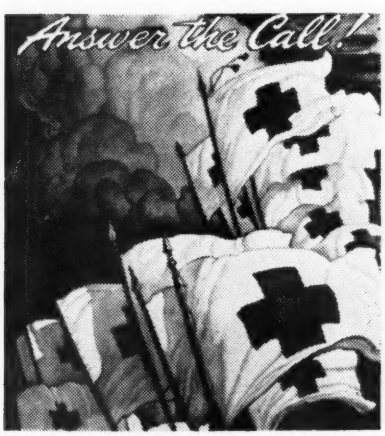
Just as it would be maladroit to hospitalize, re-educate, and serve as guide, model or teacher to a psychoneurotic with a basically reliable ego; so would it be practically gauche to encourage a markedly ego-deficient character to free-associate into a full transference psychosis. It is imperative to evaluate ego function very early in the psychotherapy. Sometimes this is not easy because neurotic symptomatology may mask a more marked ego-deficiency. When such is the case, the conversions, anxieties, phobias and compulsions tend to be intense, brittle and rapidly interchangeable. I regard several indicators as helpful. Has the patient ever been able to travel up the road of intimacy into a close and lasting relationship with another person? Has he been able to have pleasurable experience without undue anxiety and guilt? Has he been able to pursue a task until he does it well and with personal satisfaction? And has he had at least one stable parent? In so far as these things are missing he may be said to be ego-sufficient.

A hospitalized schizophrenic may speak to nobody, avoid everyone, and race feverishly about in a world so private that his surroundings do not appear to exist for him. A less severe case may show fundamentally the same behavior. He perhaps remains difficult of access and receives news of his wife's death with astounding blandness. Yet with heated breath he impels at another his centrality in persecutory or grandiose schemata. Activity in current object relationships seems present only in the negative sense that they are being pushed away, made as distant as possible. A person addicted to alcohol gives every appearance of ignoring love, loss of love, even death itself and practically any other current reality. He makes one exception: his terms for providing us with any but the most negative of his emotions are that we conspire in his acquisition of drink and more drink. His first request on return from stupor is the same. This refused, he may apply himself steadily and with great artistry to manipulating his strength toward early release from our attentions so that he may on his own acquire drink. Similarly the homosexual sociopath often exploits his occupational and general social activities for appearance's sake, distantly and without real object interest in the here and now. He saves his emotionality for a special setting, activity and object; yet this special situation is either anxiety ridden or largely emotionally blacked out, and nets him little in the way of long term gains. And so it goes—from the man who seems to find his only happiness in prison or other reprimand, to the woman whose pattern of seduce and deprive seems to well nigh fill her existence. In fact, in any person who persistently and without apparent

stimulus converts his emotional energies into narrow activities which carry a quality of necessity—such as feverish work, arrogative collecting of affluence, wealth, social names, etc., excruciatingly meticulous housekeeping, eternal striving to markedly change the body image by exercise, cosmetics, diet and apparel, or any similar compulsoid pursuits—gives evidence of greater or lesser ego immaturity. These people show an incapacity for awareness, communication, continuity and reciprocal success in current interpersonal relationships.

This incapacity to relate is the very thing which circumscribes, attenuates and tests to the limit our therapeutic efforts. We may call this a transference—sociopathic, psychotic, pseudoneurotic, borderline or what you will. At any rate, we may expect for ourselves the same negative, unpredictable and oppositional attitudes that the patient has dished up in his life with others before us. We must also be receptive to positive yet equally unrealistic dependent attachments, and be adaptable enough to walk that tight rope whereupon one does not reject such infantile attachment yet uses it to point up the patient's unrealistic orientation. We must go through long periods of playful and hostile irrelevancies and patiently yet firmly redirect the patient to more rewarding communication. In order to avoid untimely terminations and provocative acting out we must be prepared at any time to stabilize the therapeutic situation by engineering movements away from massive increments of anxiety such as may occur when symptoms are relinquished.

In order for us to maintain self-respect and the respect of those who seek our services we must ever more nearly approach those ultimate objectives of all psychotherapy, which are the effective and lasting relief of personal distress and social maladaption. An infinite variety of problematic situations invariably arise in any psychotherapy directed to those largely holergastic disorders which occupy a more and more predominant sector of our practices. With stereotyped and rule-bound procedures one can never hope to cover adequately the many faceted expressions of self-negation and social inadequacy met in ego-deficient characters. A rule or habit of the therapist may not correspond to the genuine needs of the patient. But therapists, like patients, tend to have their own habits and rules. Any one patient can never hope to have a perfectly flexible therapist, or even among several to find all the receptivity, adaptability, patience and firmness his illness may require. On the other hand we can, in any one of our therapeutic lifetimes, multiply our chances of meeting this problem by regular communication among ourselves as to what succeeds and what has failed in this therapeutic impasse or that problematic behaviorism. The main laboratory of psychotherapy lies in the clinical interview itself and the main facilitation of our work lies in the communcation of our experiences to one another.

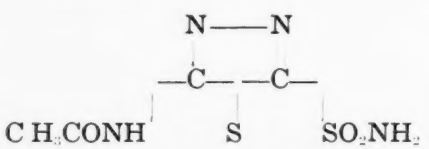


Diamox Acetazolamide in Treatment of Epilepsy

TOYOJI WADA, TOKIJIRO SATO and SHOHACHI MORITA

The antiepileptic medications currently in use are potent anticonvulsants and relatively low in toxicity. However, these standard remedies fail in some cases of epilepsy. For this reason the need for a more effective antiepileptic agent, with fewer undesirable side reactions is apparent. The medications now on the market are similar in chemical structures and their constitutional formulae suggest to a certain extent their clinical action. Most of these drugs are barbiturates.

Diamox,® reported by Bergstrom and Lombroso in 1952 as having antiepileptic action, is based on an entirely different mechanism of action. It was initially synthesized by Roblin et al. as a diuretic. The constitutional formula of Diamox Acetazolamide, *a* sulfonamide derivative, is 2-acetylamino-1, 3, 4-thiadiazole-5-sulfonamide. It is crystalline in form, white in color, the taste is bitter, it is odorless and it is soluble in water. The structure is as follows:



We have recently used Diamox Acetazolamide with very satisfactory results in the treatment of epilepsy. The present paper is a report on the clinical results, especially as regards the control of seizures, the characteristics of the compound, its influence on the electro-encephalogram and a comparison with other therapeutic agents used in epilepsy.

Clinical Results:

Children with frequent seizures, who did not respond too well to standard antiepileptic medication or responded well but with pronounced side effects, were chosen for this study. The majority of the patients had convulsive and psychomotor seizures. There was one case with petit mal absence and one with autonomic seizures. A total of 21 patients were treated with Diamox Acetazolamide, eleven male and ten female, ranging in age from ten months to forty years. The ages at initial onset of seizure and the ages when first observed are shown in Table I.

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TABLE I

Age When First Seen and Age at Initial Onset of Seizure

		Less 1 yr.	1 - 4	5 - 9	10 - 19	20 - 29	30 - 39	Over 40 yrs.	
Age when first seen.	F	0	5	3	3	0	0	0	
	M	1	0	3	2	2	1	1	
Total:		1	5	6	5	2	1	1	21
Age at initial onset of seizure	F	4	1	4	2	0	0	0	
	M	1	3	2	3	0	1	0	
Total:		5	4	6	5	0	1	0	21

Types of seizures are shown in Table II. The convulsive seizure group included four cases of minor seizure, often encountered in patients under prolonged administration of anticonvulsive medication, and nine patients with histories of convulsive seizure with psychomotor seizure. Special mention must be made that seven of the nine patients were in status epilepticus when treatment was started.

TABLE II

Types of Seizure (Lenox's Classification)

CONVULSIVE SEIZURE GROUP		24
Grand mal	15	
Local—localized convulsion	5	
Minor seizures	4	
PETIT MAL GROUP		9
Petit absence	1	
Myoclonic	5	
Massive myoclonic	3	
Astatic	0	
PSYCHOMOTOR SEIZURE GROUP		11
Automatism	7	
Subjective	3	
Arrest	1	

The histories of these cases are presented in Table III. About half the patients had some organic or other brain lesion. The hereditary factor was unimportant. Only one patient was issue of an intermarriage. There were also two cases of isolated convulsion.

TABLE III

Previous Illnesses

Head Trauma	5 cases
Birth Trauma	4 cases
Pyrexial disease	3 cases
Negative hereditary factor	1 case
Isolated convulsion	2 cases

Sixteen patients had been on antiepileptic medication prior to administration of Diamox Acetazolamide. The remaining five cases had received no treatment and were considered "new cases." The medications used in the treatment of the old cases were: Aleviatin—8 cases; Aleviatin with phenobarbital—8 cases; and single or combined use of Mysoline, Minoaleviatin, Phenacemide and phenobarbital on a smaller number of cases (see Table IV). These include patients who responded well to Phenacemide and Mysoline but the majority of them were not on these

TABLE IV—*Seizure Controls Before and After Diamox*

			Prior to Diamox					Following Diamox administration								
				Frequency of attacks				Effects by types of attacks								
No.	Sex Age	Other drugs previously given	Effect	Convulsion	Others	Duration of medication	Diamox alone or with other drugs	Convulsion	Myoclonic type	Psychomotor	Minor	Absence	Frequency of attacks	Effect on mental state	Day of administration	Side effect	Increased urination
(1)	M 10M			(10-20) x5/d			Diamox 0.37	+++⊙					0	+	22	+	-
2	F 2 y	Aleviatin	(+)		3-5/d	24d	Diamox 0.5	+++	+++⊙				0	+	15	-	-
3	F 3	"	(±)	20-30 /d		2M	- " -	+++⊙					0	++	23	-	
4)	F 4				10-20 /d		Diamox 0.37	++		++			3-10 /d	+	23	-	
5	F 7	Aleviatin	(-)		10-15 /d	15D	Diamox 0.5			+++⊙			0	++	50	-	++
(6)	F 9			7/d			Diamox 0.25	++					2/w	±	28	-	
7)	M 10	Phenacemide			2-5 /d		Diamox 0.62					+	1-2 /d	±	85	-	+
8*	M 12	Aleviatin Mysoline	(+++)		0	8M	Diamox 0.5	+++		+++			0	++	33	-	+
9	M 22	(Aleviatin (Luminal (Mino-Alev. (Phenacemide	(+)		2-6 /d	2-6	- " -	±		±			2-5 /d	±	15	-	
10**	F 2	Aleviatin Luminal	(++)		1-2 /M	6y	Diamox 1.0			-			2-4 /d	±	15	-	
11	M 2	Aleviatin Luminal Hysoline	(+)		40-50 /d	2y	Diamox 0.5 Alev. 0.2	+++⊙	±•				30-50 /d	-	8	+	+++
12	M 2	Aleviatin Luminal Mino-Alev.	(±)	30/D	40/D	22D	Diamox 0.5 Mino-Alev. 0.3	++	-	+	±		16-25 /D	+	17		
13	M 2	Aleviatin Luminal	(+)		2-3 /W	2Y5M	Diamox 0.5' Mysoline 0.75	±	-		-		1-st/D	+	82	-	+
14	F 5	Aleviatin Luminal	(±)		2/W	9M	Diamox 0.5 Alev. 0.45	((-))•			-		1-5/D	++	43	-	
15	F 7	Aleviatin	(±)	2-5/D		14D	Diamox 0.37 Alev. 0.2	+++⊙					0	±	11	-	
16***	M 8	Aleviatin Luminal	(+)	1-2/2M		2Y3M	Diamox 0.37 Alev. 0.2	±	±				1/M	±	10	-	
(17)	F 8			5-15/D			Diamox 0.5 Alev. 0.1	++					1-4/D	±	37	-	+
18	F 15	Aleviatin Luminal	(++)	1-2/M		1Y3M	Diamox 0.75 Alev. 0.35 Luminal 0.1	±					1-2/M	+	60	-	
19	F 16	Aleviatin Mysoline	(+)		4-5/D	1Y5M	Diamox 0.5 Alev. 0.5 Mysoline 0.5	±			±		4-5/D	-	14		
20	M 37	Aleviatin	(-)	2-st/y		10D	Diamox 0.25 Alev. 0.15	+++⊙					0	+	15	-	-
21	F 40	Aleviatin	(-)		1-7/D	7Y	Diamox 0.5 Alev. 0.3	++•	++				2/M	+	30	-	

* Attacks relieved prior to Diamox, but could not attend school because of side effects.
** Autonomic epilepsy, with abdominal pain and generalized sense of heat at onset of attack as the main complaints.
*** Had a habit of wandering away; treated for better mental state.

( ) New cases (( )) Attacks following Diamox.
⊙ In status epilepticus or frequent attacks at the onset of treatment.
• Has a history of status epilepticus.

drugs during therapy with Diamox Acetazolamide. Duration of treatment with the antiepilpetics ranged from ten days to seven years. Control of seizures with these drugs is shown in Tables IV and V. The cases in Table IV with infrequent seizures several times a month or year were not able to continue treatment because of toxic symptoms following status epilepticus or prolonged use of antiepileptic medication.

As far as possible Diamox was given alone but when it was not effective as sole medication it was used in conjunction with the drug previously employed, which usually was given in smaller doses. Diamox Acetazolamide was started in daily doses of one 250 mg. tablet. Close observation for several days on this schedule including the presence or absence of side effects was followed by a gradual increase of half a tablet (125 mg.) at a time, until the medication controlled seizures. Maximum daily dose was four tablets (1 gram Diamox Acetazolamide) and the average daily dose was 500 mg. (2 tablets). Temporary increase in frequency of seizures, which often occurs during a change in medication, was relatively low and was observed in only three cases. Observation periods ranged from eight to 85 days, the average being thirty days. Whenever the drug was found definitely to have served its purpose effectively, administration was stopped even though the course of therapy was short. (Tables IV, V and VI.)

TABLE V

Frequency of Attacks Prior to Diamox

Over 10 per day	5 cases
Ten or several per day	8 "
Several per week	4 "
Several per month	3 "
Several per year	1 case

TABLE VI

Diamox Dosage and Period of Administration

Dosage (250 mg.)		Period of Administration	
1 tab.	2 cases	Less than 10 days	4 cases
1.5 tabs.	5 "	10-20 days	6 "
2 "	10 "	20-30 days	3 "
2.5 "	1 case	1-2 months	5 "
3 "	2 cases	2-3 months	3 "
4 "	1 case		
Average: 2 tabs. (500 mg.)		Average: 30 days	

Table IV shows the effects of Diamox Acetazolamide. The control of seizures in old cases prior to Diamox is shown in the column "Prior to Diamox." The degree of control is stated in the column "Frequency of Attacks"; "+ + +" represents 80 to 100 per cent control; "+ +" 50 to 80 per cent; "+" less than 50 per cent; "±" no change; and "—" aggravation. Results following the administration of Diamox are shown in the column "Following Diamox administration." Compared with seizure control prior to Diamox complete inhibition of attacks during therapy with Diamox is represented by "+ + +"; 50 per cent or better improvement by "+ +"; less pronounced improvement by "+"; no change by "±" and aggravation by "—".

Worthy of special mention is the effectiveness of Diamox in status epilepticus or a condition similar to status epilepticus. Seven patients, six children and one adult, were in status epilepticus when therapy with Diamox was initiated. The majority of them had very frequent seizures, five of the convulsive type, one myoclonic petit mal (Case No. 2) and the remaining patient so-called arrest seizure (Case No. 5). Diamox alone dramatically controlled status epilepticus in four cases. Frequent attacks in the remaining three were reduced by Diamox but required adjuvant medication to attain complete control. This effect was attained in spite of reductions in the dosage of the antiepileptic compared with doses administered prior to Diamox.

The following case histories give a picture of seizure control:

Case 2. Two year old male, with diagnosis of myoclonic petit mal. Family history essentially negative except for one psychopath. Normal birth at full term. Myoclonic jerks were noted in the extremities about the eleventh month of life. He had occasional generalized convulsions and drop seizures appeared some time later. Patient had 15 to 20 convulsions daily. Spasm mutans was also noted six months before he was first examined elsewhere. Patient's mental faculties were low and articulation very poor. Convulsions recently decreased to three to five a day, lasting for fifteen to thirty seconds. Practically no improvement was noted with Aleviatin. Diamox Acetazolamide was added to the medication and the dose increased from 250 mg. to 500 mg. daily. There was no increase in urinary output but diarrhea persisted for several days. The

patient had no fits during the fifteen days he received Diamox, after which he was discharged. Fretfulness, emotional unrest and emission of a peculiar cry noted previously were somewhat improved at time of discharge and the patient was docile.

Case No. 5. Seven year old male with clinical diagnosis of psychomotor type seizure epilepsy. Family history essentially negative. Child was weak, born in an asphyxial condition due to prolonged labor. He had pyrexia of undetermined etiology. From about five years of age the patient, soon after retiring or near dawn, would suddenly rise from bed in a state of somnambulism and then cry himself to sleep. These attacks occurred once or twice a month. When about seven years of age the patient developed attacks of anger, perspiration and generalized rigidity. These seizures, which occurred several to ten odd times daily, usually lasted less than one minute, and were followed by fits of weeping. During the attack the patient would sometimes respond if called loudly by name. He gradually grew worse and the attacks were accompanied by marked ill humor and upon occasion he flared up in sudden anger. A temporary decrease in the frequency of the attacks after administration of Aleviatin was followed by aggravation which reached status epilepticus. He was given 500 mg. of Diamox daily as sole medication and the attacks were completely controlled although there was a temporary increase in the urinary output. No attacks have been noted for fifty days following this course of treatment. He is no longer fretful. During therapy he showed a temporary tendency to buoyancy and activities which bordered on the flippant.

Case No. 8. Three year old male with a clinical diagnosis of Jacksonian epilepsy in status epilepticus. The patient's mother and maternal grandmother both had a persistent hemicrania. Normal birth at full term. Patient's history includes a head trauma when fourteen months old. Four months later he had a clonospasm, which then occurred frequently but subsequently disappeared spontaneously. Jacksonian seizures, often in status epilepticus, were frequent from the age of 32 months. Aleviatin did not improve his condition. Paresis occurred in the left arm. When treatment was started the patient averaged thirty to forty attacks daily. Combined therapy with Aleviatin, I gram and 250 mg. of Diamox daily markedly reduced the frequency of the seizures. On the eighth day the patient developed fever. A diagnosis of suppurative isthmitis was made and he was treated with penicillin and illotycin. This illness had little effect on the convulsions, which occurred at the rate of four or five daily. With the return to normal temperature the patient was started on 500 mg. daily of Diamox as sole medication. Since then the fits have ceased and the paresis and articulation disturbance relieved. The patient has also become less fretful and is more active.

TABLE VII

Effect of Diamox on Seizures

	Control of Seizures											
	80 to 100%		50 to less than 80%		no change		increased		Total	
Type of Seizure	old	new	old	new	old	new	old	new	old	new	old	new
Convulsive	6	1	2	3	0	0	5	0	1	0	14	4
Myoclonic	1	0	0	0	0	0	2	0	2	0	5	0
Psychomotor	2	0	1	2	1	0	1	0	1	0	6	2
Minor	0	0	0	0	0	0	2	0	1	0	3	0
Absence	0	0	0	0	0	1	0	0	0	0	0	1
Total	9	1	3	5	1	1	10	0	5	0	28	7
Percentage	32	51	11		3.5		36		17.5			

Table VII shows the effect of Diamox on the different types of seizures. Diamox proved to be more effective than the medications previously used. Improvement with Diamox was seen in 43 per cent of the cases, no change in 36 per cent and an increase in frequently in only 17.5 per cent. Approximately 100 per cent control of seizures was noted in 32 per cent of the patients who responded favorably to Diamox. If the new cases are included the drug proved effective in 51 per cent of the cases. Special attention should be drawn to the fact that none of the new cases became worse or remained unchanged following administration of Diamox Acetazolamide. In other words, Diamox was effective in all the new cases treated.

Study of the effect of Diamox on the mental condition of the patients showed some improvement in more than half the cases treated. However, the efficacy of Diamox must also be evaluated in terms of reduction in frequency and control of seizures. Compared with standard anticonvulsive medications Diamox produced considerably fewer side effects.

TABLE VIII

Effect of Diamox on Mental State

Result:	Good	Moder.	No change	Aggrav.	Total
	++	+	±	—	
No. of cases:	4	9	6	2	21
	19%	43%	28.5%	9.5%	100%

Table IX shows the effect of Diamox on behavior patterns. Most of the changes noted were positive in character. On the one hand, the patients adapted better to their environ-

ment as they grew cheerful and active. On the other, stabilized emotions made them reflective and better able to concentrate.

TABLE IX

Effect of Diamox on Behavior Patterns

PERSONALITY	
Emotional unrest	6
Quick temper	5
Obstinacy	5
Capriciousness	5
Tardiness	4
Too serious	3
MENTAL	
Cheerful	8
Active	6
Self-composed	5
Aggressive	3
Fretful	1
Unrest	1
PHYSICAL	
Diarrhea	3
Frequent urination	2
Anorexia	2
Sleeplessness	1
Bed wetting	1
Skin Eruption	1

As regards side effects, almost none of the subjective symptoms commonly caused by the standard antiepileptics were observed following therapy with Diamox. The side effects noted limited to mild anorexia, diarrhea, frequent urination, bed wetting, insomnia, skin eruptions, etc., were so slight that they could be considered non-existent as compared to those produced by the anticonvulsants in common use. Diamox did not cause any somnolence ataxia or diplopia, often encountered following the administra-

TABLE X

Effect of Diamox on Electroencephalograms

	PRIOR TO ADMINISTRATION OF DIAMOX		AFTER DIAMOX ADMINISTRATION		
Case No.	Pattern	Evaluation	Pattern	Improvement	Evaluation
2	Sh. Sp-W-C Non-parx. (1-5c)	Abnormal	Sporad. HVS (5-6c) Non-parx. (5-6c)	+++	Abnormal
3	Sp-W-C Sporad. HVS (4-6c) Non-parx. (6-7c)	Abnormal	Sh. Sporad. HVS (5-6c) Non-parx. (5-6c)	++	Abnormal
5	Sh. Rhyth. HVS (6-7c) Non-parx. (5-6c)	Abnormal	Sh. Sh-W-C Sporad. HVS (2-3c)	—	Abnormal
7	3-Sp-C Sporad. HVS (3c)	Abnormal	3-Sp-W-C Sporad. HVS (4c)	±	Abnormal
8	Sp-W-C Sporad. HVS (5-6c)	Abnormal	Sh. Sporad. HVS (4c)	++	Abnormal
10	Normal	Normal	Normal	±	Normal
11	Ml. Sp-W-C Sporad. HVS (3c)	Abnormal	Ml. Sp-W-C Sporad. HVS (3c)	±	Abnormal
12	Sp-W-C Sporad. HVS (3-4c) Non-parx. (3-6c)	Abnormal	Sh-W-C Sporad. HVS (3-4c) Non-parx. (4-5c)	+	Abnormal
17	Sh.? Sporad. HVS (6c)	Borderline	Normal	+++	Abnormal
18	Sh. Sporad. HVS (6c)	Abnormal	Sh. Sporad. HVS (6c)	±	Abnormal
19	Sh-W-C? Sporad. HVS (6c) Non-parx. (6-7c)	Abnormal	Sporad. HVS (6-7c)	±	Abnormal
20	Sp. Sporad. HVS (2-3c) Non-parx. (2-3c)	Abnormal	Sporad. HVS (3-4c) Non-parx. (6-7c)	—	Abnormal
21	Sh? Sporad. HVS (3-4c)	Abnormal	Sporad. HVS (4-5c) Non-parx. (5-10c)	—	Abnormal

REMARKS: Sp: Spike Wave, Sh: Sharp W., Sp-W-C: Spike and Wave Complex, Sh-W-C: Sharp and Wave Complex, Ml. sp-W-C: multiple Sp-W-C, 3-sp-W-C: 3 cycle rhythmic sp-w-c, Sponad. HVS: sponadic high voltage slow wave, Rhyth. HVS: rhythmic HVS: rhythmic HVS, Non-parx: non paroxysmal HVS, Asym: Asymmetry, A: Abnormal, B: Borderline, N: Normal.

tion of standard antiepileptic medications. Treatment with Diamox was discontinued in only one case, in part because of side effects. This patient had received up to 1 gram daily of Diamox. No side effects were noted in another patient who had developed such pronounced allergy to other antiepileptic drugs that treatment was suspended.

Diamox Acetazolamide, originally developed as a diuretic agent, increases urinary output. An increase in the urinary output was observed in six of eleven patients whose urinary volume was kept under close observation during therapy with Diamox. Of interest in this connection is that four of the remaining five patients, with practically no increase in urinary volume, showed dramatic response to Diamox.

Influence of Diamox on the Electroencephalogram

Some improvement was noted in about half the cases treated with Diamox. Only two patients showed changes from abnormal to normal or borderline electroencephalogram patterns. The improvements noted fell largely within the range of abnormal. Compared with the improvement noted following the use of barbiturates the electro-encephalogram changes caused by Diamox were in no wise remarkable. However, abnormal wave patterns tended to decrease or disappear. Also, the delta and beta waves in the basic pattern tended to improve into the normal range with some increase in amplitudes as shown in Table X. Fig. 1 shows a sample of the record.

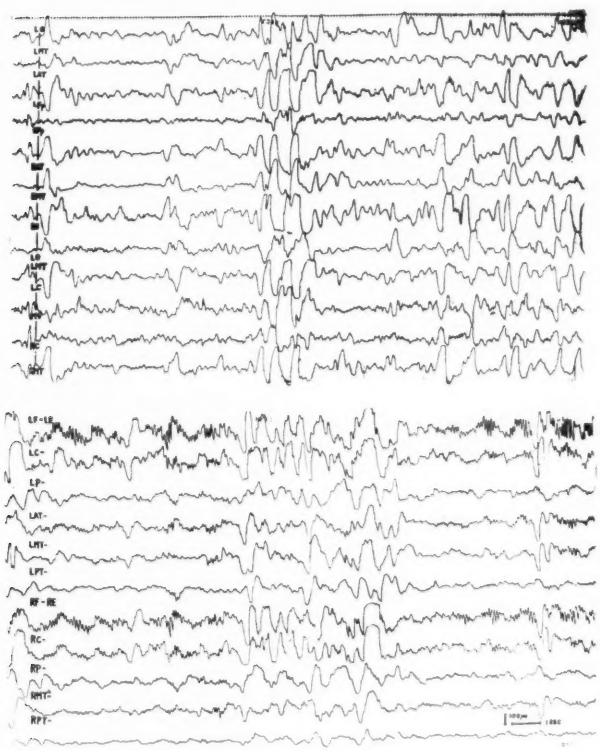

Figure 1. Changes in abnormal brain waves following therapy with Diamox (Case No. 2—2 year old male).
a) Before Diamox
b) After 15 days' Diamox

The typical three period rhythmic spike-dome complex in patients with petit mal showed little or no improvement. Although Diamox had some influence on the basic pattern, our impression is that the drug was not very effective in the brief period of time, when the electroencephalographic pattern shows the so-called epileptic waves. Unlike Phenacemide, where marked improvement in the brain wave pattern is followed by improvement in the clinical picture, Diamox showed no parallel between the electro-encephalographic and clinical improvement.

Discussion

Sulfonamide has long been known to increase urinary output and alter the urinary pH. However, it was Davenport who first thought of it as a diuretic. Roblin et al. in 1950, successfully synthesized Diamox, which is 50 to 400 times more potent than sulfonamide as a diuretic but proved ineffective as a chemotherapeutic agent.

The use of Diamox in the treatment of epilepsy is relatively new and was first described by Bergstrom and Lombroso in their clinical reports released in 1952. On the theory that burdensome ketogenic diets could be replaced by Diamox, it was first administered to patients with minor seizures. Diamox proved effective in only 19 per cent of the cases treated but there was no aggravation. The general evaluation at that time was that Diamox could not be expected to prove very effective as an antiepileptic. Lombroso used long-term administration of the drug and found it effective in 54 per cent of his cases. Control of seizures was observed in 90 per cent of the cases treated. Lombroso emphasized the clinical merits of Diamox. He had good results with Diamox in the treatment of not only petit absence, but also in other types of epilepsy by improve-

ment in the brain waves which were greatly influenced by hyperpnea. The antiepileptic effect was pronounced in a group of patients with negative genetic factors. Merlis found Diamox effective in 74 per cent of his cases. Control of seizures was excellent (over 80 per cent) in the group successfully treated.

Diamox proved effective in 51 per cent of our patients, with complete control of seizures in 55 per cent which coincides with Lombroso's findings. Results with Diamox in the control of different types of attacks was 68 per cent for convulsive seizures, 62 per cent for psychomotor seizures, 20 per cent for myoclonic seizures and low in cases of petit absence. No improvement was noted in the cases of minor seizure, which means that Diamox has little effect in cases with types of seizures influenced by other therapeutic agents which, however, do not control the convulsions. Large doses of Diamox alone in autonomic seizure cases only worsened the clinical picture. Diamox was also used in epileptic children with a behavior pattern of wandering. A short observation period did not reveal any substantial improvement in this tendency.

While the optimal daily dose of Diamox Acetazolamide is placed at 8 to 20 mg/kilo body weight, our experience indicates that daily doses of 0.37 to 0.5 grams are fully effective. Reported side effects include headache, excitement, sense of fatigue, gastrointestinal disturbances, labored breathing, paresthesia thirst, somnolence, fretfulness, tinnitus, bed wetting, vomiting and ataxia. Changes in the blood picture and hepatic or renal dysfunction were not reported in any of the cases treated.

Positive changes in the mental condition included improvement in behavior patterns and activity noted in one third of the patients. In this study slight side effects, as noted, were observed in a small number. The authors' impression is that the toxicity of Diamox is relatively low. This is in line with Lombroso's findings.

As already stated Diamox was found to be especially effective in the control of frequently occurring seizures and in status epilepticus. This seems to be characteristic of its antiepileptic action. There have been reports on a few other characteristics of Diamox Acetazolamide as an antiepileptic agent but there do not seem to be any reports that Diamox effectively controls the frequent onset of seizures or inhibits status epilepticus. These effects of Diamox merit further study.

Conclusion

Twenty-one epileptics, the majority of them children, who failed to respond to other antiepileptic medication or who had not received any previous treatment, were given Diamox. The therapeutic effects of the drug and changes in their electroencephalograms were studied. Results were as follows:

1) Diamox was found to have a pronounced effect in those cases of convulsive or psychomotor epilepsy that cause frequent seizures. This effect was especially marked in infantile epilepsy. The use of Diamox alone or in combination with other antiepileptic agents proved very effective in all patients in status epilepticus. Diamox is thus useful as an emergency measure in status epilepticus.

2) Myoclonic seizures occasionally yielded to Diamox to some extent.

3) Diamox, in one case of petit mal absence with 3 period rhythmic spike delta waves, was not very effective. The clinical condition of another patient with autonomic seizures became worse following the administration of Diamox.

4) The over-all rate of improvement following therpay with Diamox Acetazolamide was 50 per cent. Seizures were completely controlled in 55 per cent of the patients who showed improvement. Twenty per cent of the old cases, with over 50 per cent improvement rate prior to Diamox, showed a further improvement of 23 per cent following Diamox.

5) Not only were seizures controlled in patients with toxic effects from the prolonged use of other antiepileptic agents, but remarkable improvement in their mental condition was noted following therapy with Diamox.

6) Practically no allergies or side effects were noted except in patients on high doses of Diamox. Six of eleven patients had increased diuresis. The remaining five, who showed no increase in urinary output, had

fewer seizures than they had before the administration of Diamox.

7) Improvement in the electroencephalographic pattern consisted largely in better basic waves. Regarding improvement in abnormal wave patterns, our impression is that short-term therapy with Diamox is not effective.

8) Improvement in the mental condition parallel to seizure control was noted in more than half the cases studied. This improvement was reflected largely in a more cheerful outlook and stabilized emotions.

9) Diamox alone proved especially useful in controlling seizures and improving the mental condition of the patient. Its use with other antiepileptic agents strengthened the weak points of the other medication. Combined use appeared to be synergistic.

10) In view of the above findings Diamox Acetazolamide may be considered effective in the treatment of infantile epilepsy, especially in cases of status epilepticus. Diamox is also effective in primary and secondary changes in the brain waves caused by status epilepticus. The effect of Diamox is considered to be related to water metabolism.

Authors' Note: Diamox is manufactured by Lederle Laboratories, Pearl River, N. Y., and supplies of the drug were generously furnished for this study.

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Book Review

INTRODUCTION TO PSYCHIATRY: By O. Spurgeon English, M.D., Professor and Chairman, Dept. of Psychiatry, Temple University School of Medicine, Phila., Pa., and Stuart M. Finch, M.D., Assistant Professor of Psychiatry, Temple University School of Medicine, Phila., Pa., Cloth. $7.00. Pp. 621. W. W. Norton & Company, 101 Fifth Avenue, New York 3, N. Y.

The book which is textual in scope is planned along the lines of the present day concepts of dynamic psychiatry and conforms closely to the most recent revision of the nomenclature adopted by the American Psychiatric Association. The book logically and chronologically emphasizes, in a practical manner, the psychopathology of the thoughts and feelings of the child, a requisite which is so essential for a well grounded symptomatological appraisal in the treatment of the adult whose difficulties of thought and behavior are but a regression to childish acting and thinking. Emotional disorders and disturbances of the adult classifiable as psychoneurotic conditions are presented, and the pathological aspects of the abnormal personality disorders are clearly delineated as the many-sided behavioral situations found within this category. The concurrent influences of psyche and soma and the physiological expressions of these unconscious emotions receive exhaustive discussion, and these psychophysiologic illnesses once more follow the adopted classification of the American Psychiatric Association. The book provides well written textual material on the psychotic disorders, both functional and organic, with final chapters on mental deficiency as well as practical principles of psychotherapy and other recognized therapeutic procedures. Throughout its content, the book is replete with helpful illustrative case material under each category under study, together with the methodology of suggested treatment of the specific disorder described.

In the reviewer's opinion, the book well merits the interest of practitioners, students of the subject and others concerned with the acquirement of a practical psychiatric and psychoanalytic approach to the subject.

Lewis J. Siegal, M.D., LL.B.

BOOKS RECEIVED

HANDBOOK OF LEGAL MEDICINE: By Louis J. Regan, M.D., LL.B., Professor of Legal Medicine, University of Southern California, and Alan R. Moritz, M.D., Professor of Pathology, Director of the Institute of Pathology, Western Reserve University. Cloth. Pp. 201. The C. V. Mosby Company, St. Louis, Mo. 1956.

THE ORGANIZATION OF THE CEREBRAL CORTEX: By D. A. Sholl, Reader in Anatomy in the University of London. Cloth. $4.25. Pp. 125. John Wiley & Sons, Inc., 440 Fourth Avenue, New York, N. Y. 1956.

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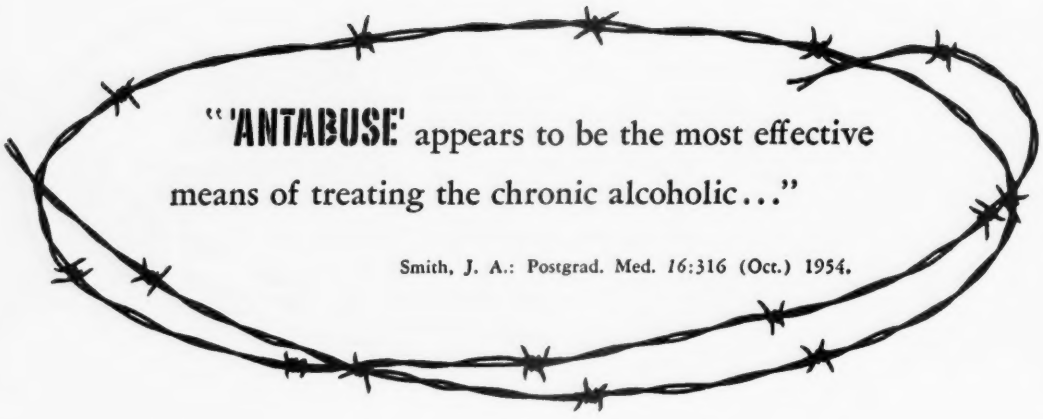

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